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THE ALUMINUM CARTEL

BY
LOUIS MARLIO

CORRECTION:

P. 126 - Subtitle to the table should
read: (Prices per long ton
in pounds sterling of fixed
gold content).



THE BROOKINGS INSTITUTION
WASHINGTON, D.C.

1947

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**Set up and printed
Published April 1947**

Printed in the United States of America
George Banta Publishing Company
Menasha, Wisconsin

PREFACE

The American people have long been concerned over the growth of large-scale business enterprises and especially combinations of business groups. The focus of attention has, however, shifted frequently. In the late nineteenth century public concern found expression in the so-called "granger" and antitrust campaigns. In the early 1900's it centered, first, on industrial monopolies and subsequently on the investment banking money trust, with special reference to intercorporate boards of directors. Following the crisis of 1929, the emphasis shifted to investment trusts and holding companies and the commercial banks and affiliated financial institutions. In the late thirties, under the aegis of the Temporary National Economic Committee, interest was broadened to include concentration of economic power in all its forms and manifestations.

With the coming of the second World War, interest shifted from domestic combinations to international cartels, which were regarded as somehow or other responsible for the new world conflict. Indeed, in the view of many, cartels are the very embodiment of the evils of industrialism and a primary instrumentality of imperialism and aggression. A less extreme position is that the cartel is one of the most formidable obstacles to the free development of international trade and hence a serious barrier to world recovery.¹

¹ This is the position set forth in the agenda prepared by the Department of State for the International Conference on Trade and Employment soon to be held.

In discussions of cartels there is commonly little differentiation among the various types of associations or organizations involved. In a loose way the term "cartel" is related to all sorts of monopolistic elements in the international sphere such as intergovernmental commodity agreements and patent laws, as well as private industrial enterprises associated in cartel organizations. Even the private cartels are of varying types and have followed divergent policies.

In general, private industrial cartels stand midway between competitive organization and monopoly. Whereas the monopoly is a unified organization exercising sufficient control over production and selling operations to dominate more or less permanently its field, the industrial cartel is an association of producers in a given industry which, while remaining economically, financially, and technically independent, submits to common rules intended to reduce risks, stabilize operations, and promote the long-term interests of the industry. The terms of the agreement are subject to abrogation and renewal in the light of changing conditions. While cartels depart in significant respects from the principle of unrestricted competition, they often retain important competitive policies. The extent to which competition is retained of course varies widely in the different cartel organizations, reflecting sometimes differences in conditions in the respective industries and sometimes simply the views and policies of those who direct them.

The present study has a limited objective. The author does not undertake to appraise the economic and political

significance of cartels in general or even of private industrial cartels as a whole. This is a case study of one of the most important international cartels in the industrial field. The author believes that the problems and policies which are discussed have much relevancy to all types of cartel organization, both private and public. However, he does not suggest that the operating principles here employed would be equally applicable in other lines of industry.

The author is in a position to write authoritatively about the aluminum cartel because for twenty years he was managing director or chairman of the French Aluminium Company, and from 1926 to 1939 was chairman of the International Aluminum Cartel. This authoritative report should serve as a corrective to numerous misstatements and misinterpretations of aluminum cartel policy by authors not in a position to know the facts. The policies to which Dr. Marlio refers reflect in large measure his own conception of how an industrial cartel should be organized and operated. His primary purpose is simply to indicate how the various aluminum cartels operated and to explain the reasoning which determined the policies pursued.

Louis Marlio took advanced degrees in France, both in engineering and economics. Following a decade of government service in which he served first in the Department of Public Works, later as private secretary to Premier Millerand, and finally as a member of the *Conseil d'Etat*, he entered private business at the close of the first World War. He served not only as chairman of the Aluminium Company of France but also of the

Railway of the East. Meanwhile, he was a member of various committees of the League of Nations and was identified with constructive efforts to improve international economic relations. During these years he found time to continue academic work in the capacity of lecturer in one of the French institutions of higher learning. Meanwhile, also, he wrote a number of volumes on economic and political subjects. One, entitled *Democracy or Liberty*, published on the eve of the German invasion of France, was among the books proscribed by Hitler. In 1934 he was elected a member of the Institut du France.

In 1940 Dr. Marlio resigned permanently from all his business connections, and since that time he has devoted himself to scientific work. He has been a member of the staff of the Brookings Institution since early 1941. During the war period he rendered important service in a consulting capacity to the American government.

Following an introductory chapter, the author explains the differences in prevailing attitudes with respect to cartels in Europe and America. The discussion is divided into two parts. The first presents in succinct form the history of the numerous cartel agreements which have been formed in the aluminum industry from 1901 to 1939. The second division sets forth the major objectives of policy and the results achieved. Because of current views with respect to the role of industrial cartels in the German war mobilization program, the author sets forth the policies pursued by the aluminum cartel with respect to the German rearmament program.

HAROLD G. MOULTON, *President*

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CHAPTER I

INTRODUCTION

It may be of interest as a preliminary to note the sharp divergence which has long existed between American and European points of view with respect to the cartel system. The American people have, traditionally, been strong adherents of the system of free competition. They consider that any steps taken to suppress, limit, control, or canalize competition is pernicious in its economic effects. This position has been held by both of the major political parties, and it finds reflection in a long list of movements and legislative enactments over the last seventy years. Today the virtues of competition are extolled by labor organizations and by most industrialists and capitalist associations.

Convinced of the benefits of unlimited competition in the domestic sphere, it is natural that Americans should be equally opposed to monopolistic organizations in the international field. Indeed, international cartels seem even more dangerous than domestic combinations in restraint of trade, because of their all-embracing character. Hostility to the cartel system became intensified in this country in late years in consequence of the monopolistic trade practices employed by the German government, which were popularly regarded as an integral part of the cartel system.

The American government shares the hostility of public opinion toward international cartels, emphasizing their effects upon the free movement of international

commerce. At a press conference on September 8, 1944, President Roosevelt gave newspapermen the text of a letter he sent to Mr. Cordell Hull, Secretary of State, which read as follows:

. . . More than the elimination of the political activities of the German cartels will be required. Cartel practices which restrict the free flow of goods in foreign commerce will have to be curbed. With international trade involved, this end can be achieved only through collaborative action by the United Nations.

On September 13, 1944 Mr. Cordell Hull answered that he was studying appropriate measures to curb international cartels.

Congress as a whole had not yet defined its attitude on this question, but the Kilgore Committee¹ took a very strong position, insisting that international cartels are a major cause of war.

The attitude of the executive branch of the United States government is of course a reflection of its underlying interest in removing restrictions on international trading operations. The policy of the United States may be indicated by reference to the terms of the Lend-Lease agreement, one of which is reproduced herewith:

In the final determination of the benefits to be provided to the United States of America by the Government of the Union of Soviet Socialist Republics in return for aid furnished under the Act of Congress of March 11, 1941, the terms and conditions thereof shall be such as not to burden commerce between the two countries, but to promote mutually advantageous economic relations between them and the betterment of world-

¹ *Cartels and National Security*, Senate Military Affairs Committee, Subcommittee Report No. 4, 78 Cong., 2 sess.

wide economic relations. To that end, they shall include provision for agreed action by the United States of America and the Union of Soviet Socialist Republics, open to participation by all other countries of like mind, directed to the expansion, by appropriate international and domestic measures, of production, employment, and the exchange and consumption of goods, which are the material foundations of the liberty and welfare of all peoples; to the *elimination of all forms of discriminatory treatment in international commerce*, and to the *reduction of tariffs and other trade barriers*; and, in general, to the attainment of all the economic objectives set forth in the Joint Declaration made on August 14, 1941, by the President of the United States of America and the Prime Minister of the United Kingdom, the basic principles of which were adhered to by the Government of the Union of Soviet Socialist Republics on September 24, 1941.²

In Europe the attitude with respect to cartels is very different. Public opinion is somewhat divided on the subject. From the political point of view, cartels appear to meet with the same disapproval as trusts, the "two hundred families" of France, and the financial magnates. At the same time, the predominant view is that under present circumstances unlimited competition may be even more harmful than collective agreements, and that it is better to erect safeguards against the dangers of cartels, both national and international, than to prohibit them altogether. The fluctuations in business activity attending unrestricted competition have had such far-reaching effects that both producers and consumers are disposed to look with favor upon collective efforts designed to reduce the severity and duration of economic

² Soviet Master Agreement, Art. 7. *Twentieth Report to Congress on Lend-Lease Operations*, for period ended June 30, 1945. Italics added.

crises and the volume of cyclical unemployment. The cartel is widely regarded as a contributor toward this end.

This attitude has been strongly manifested in Great Britain in recent years. In 1942 the British Board of Trade sent out inquiries in order to ascertain the views of industrialists on British postwar trade policy. The four great industrial associations, the Federation of British Industries, the Association of British Chambers of Commerce, the London Chamber of Commerce, and the British Employers' Federation, all declared that in principle they favored co-operation instead of unrestricted competition.

In November 1942 a statement was issued by 120 British industrialists proposing that industry should be so organized as to avoid "wasteful and uneconomic competition."

On April 30, 1944 Mr. Redvers Opie, economic adviser to the British Embassy in Washington, made the following statement.³ "If cartels are temporary arrangements to get rid of surplus capacity and to shift production from high cost producers to low cost producers, they might well serve good ends."

A great industrialist, Lord McGowan, chairman of Imperial Chemical Industries Ltd., has stated that British industrialists "have ceased to believe in the superiority of free and extreme competition and have moved a long way in the direction of co-operation in industry and central action by the government."⁴

³ At a University of Chicago Round Table.

⁴ Quoted by Milo Perkins, "Cartels: What shall we do about them?" *Harper's Magazine*, November 1944, p. 573.

The attitude of European governments toward cartels has evolved along similar lines. At the beginning of the period following the first World War, cartels were prohibited in many countries. When the second World War began, they were in some cases authorized, in some cases endowed with exceptional privileges and power, and in some cases even made compulsory. At the same time, however, they were in many cases made subject to penalties for abuse of their position.

There were four steps in the evolution of government policy toward cartels following World War I. The first was giving to them legal status. This was gradually accomplished through parliamentary acts or court decisions. In Great Britain it was effected solely by the courts, which refused to condemn cartels when their operations were regarded as "reasonable." The trend was similar in France. An ancient provision of the Penal Code (Article 429) carried penalties for all organizations which required consumers to pay more than they would have to pay under free competition. But gradually courts came to hold that restriction of competition was punishable only if it could be shown that it was detrimental to the consumer over a considerable period of years. In 1926 a law was enacted which gave legal status to cartels but maintained penalties in case of abuse. In Germany extensive legislation concerning cartels was worked out at the time of the Weimar Republic. Second, laws were enacted in some countries, especially in Japan, Italy, and Germany between 1931 and 1933, in order to give special privileges to cartels. In France a bill to the same end was passed by the Chamber

but rejected by the Senate. In some countries a law was enacted providing that in any industry where members representing two thirds or three fourths of productive capacity were in favor of organizing a cartel, they had the right to *compel* the remainder to enter a collective organization, to obey its rules, and to participate in its expenses. Third, the government was empowered actually to compel the establishment of cartels in certain industries. Finally, in fascist countries the state took over the cartels and transformed them into government agencies. This occurred in Germany and Italy after 1936 when cartels as free and independent agencies of limited duration were in reality extinguished.

The Russian government, which had a monopoly of foreign trade, agreed to participate in a number of international cartels, for instance, in oil, platinum, wheat, sugar, and cotton.

What are the reasons for this profound divergence in view in Europe and America, with respect to the actual development of cartels and the public attitude toward them? The reasons are numerous, but all are the outgrowth of one central fact; namely, the differences in opportunity for large-scale industrial expansion in a continental area, such as the United States, and in countries of restricted territory, population, and wealth, such as is typically the case in Europe.

The maximum economies inherent in mechanized industry can be achieved only when operations are conducted on a mass basis. Costs usually decline with the expanding size of the producing unit. Maximum expansion is, however, contingent upon the development of

extensive sales outlets; mass production presupposes mass consumption.

In the United States, the geographical dimensions, the abundance of natural resources, and the vast domestic markets afforded by a great population having a per capita consumption several times that existing in many European countries readily permit an almost indefinite expansion in the size of producing units. Moreover, markets are large enough to permit the existence of a number of large producing units.

The industrial handicap in European countries has been accentuated by prohibitive customs barriers and other nationalistic economic policies. The difficulties in this connection were enhanced between the two wars by the provisions of the Treaty of Versailles, which increased by 50 per cent the number of independent European countries. Each of the newer countries was seeking to buttress its political independence by attempting to achieve economic self-sufficiency. The political uncertainty in which Europe lived throughout the period between the two wars strengthened the powerful tendency toward economic nationalism. In short, nearly every country sought to develop within its own territory the key industries which were considered essential to their national defense as well as to their economic well-being.

In the existing situation there was a tendency in each of the European countries for small-scale independent producers to be replaced by one or a few large companies. Even so, the domestic market was usually not large enough to permit the realization of the full advantage of

large-scale enterprise. With still larger plants, unit costs could be reduced. Hence there was a tendency to expand the size of establishments and "dump" a portion of the product in foreign countries for whatever price might be obtained. In the main, international competition occurred in areas which did not produce the commodities in question. Cut-throat competition naturally created in due course a strong demand for price agreements which would prevent outright losses in the competitive international markets and stabilize the situation. By such a procedure it appeared possible also to reduce the prices in the producing countries. This final consideration was an important factor in determining the policies of the governments involved toward cartel organizations.

The divergence of viewpoints in America and Europe is very marked, and because of fundamentally different conditions, it is not to be expected that identical attitudes will soon prevail. It will therefore be necessary to seek a practical compromise if the cartel problem is to be dealt with jointly by the nations of Europe and the United States. Happily, this appears to be clearly recognized by the countries involved, and it is hoped that some common ground of policy can be reached.

CHAPTER II

ALUMINUM CARTELS PRIOR TO WORLD WAR I

The heroic era of the aluminum industry began in 1888 when the semi-industrial process of Sainte-Claire Deville was superseded by the electrolytic process. This brought a sharp reduction in costs and increased demand for the metal. Because of the special characteristics of the industry, later to be discussed, it was marked almost immediately by the organization of national and international associations.

From 1892 on, international agreements, generally bilateral, began to be made. However, it was not until 1901 that the first international aluminum cartel, known as the Aluminium Association, was established.

I. THE ALUMINIUM ASSOCIATION, 1901-08

The discussions leading to the establishment of the Aluminium Association began in 1900, and the Franco-Swiss proposals, which were in the main adopted, were made in April 1901. At the suggestion of the Swiss Neuhausen Company, the name "Aluminium Association" was selected. Its constitution was laid down in the agreement of November 2, 1901, and its operations were defined by the commercial contract of the same date. The agreement was to be effective for five years, to expire on December 31, 1906.

Members. The following companies in 1901 agreed to form a cartel under the aegis of the Société pour l'In-

dustrie de l'Aluminium (Neuhausen). The other members were:

The French group, consisting of two companies, namely, the Société Electro-metallurgique Française, of Froges, and the Compagnie des Produits Chimiques d'Alais et de la Camargue, of Lyon.

A Canadian company, the Royal Aluminium Company, Ltd. of Quebec, a subsidiary of the Pittsburgh Reduction Company, which has now become the Aluminum Company of America.

An English company, the British Aluminium Company, Ltd. of London.

The supervision of the rights and obligations resulting from the contract of association was entrusted to a committee composed of representatives of the contracting companies.

Marketing regulations. The agreement provided that the world market for aluminum, so far as members of the cartel were concerned, should be divided into (a) the reserved market, and (b) the free market. The reserved market originally included the domestic consumption of the United States and of France and its colonies, as well as direct deliveries to the British, German, Swiss, and Austro-Hungarian governments.¹ The free market

¹ By Article 4 of the Agreement of Nov. 2, 1901, it was stipulated that the members of the cartel should have the right of exclusive supply as follows:

The Société Anonyme pour l'Industrie de l'Aluminium shall supply aluminum to the German, Swiss, and Austro-Hungarian governments.

The British Aluminium Company, Ltd. shall supply the British government and the governments of the British colonies and dependencies which make their purchases through government departments in London.

The Royal Aluminium Company, Ltd. shall supply the domestic consumption of the United States.

The two French companies shall supply the domestic consumption of France and its colonies.

included everything which was not designated as a reserved market.

The commercial contract provided for the allotment of the metal to be supplied by each of the interested companies to all markets, both reserved and free, in the following proportions:

	Per cent
The Société Anonyme pour l'Industrie de l'Aluminium, Neuhausen	48.4
The Royal Aluminium Company, Ltd.	21.0
The British Aluminium Company, Ltd.	12.9
The French group	17.7

This applied as long as the total sales effected through the committee were less than 5,000 tons a year. If this figure was exceeded, the additional amount became subject to a new allocation.

Prices. The committee had sole responsibility for fixing prices and terms of sale both for semifinished and raw products. Neuhausen was appointed *sole distributing agent* (on the free market), with a commission of 5 per cent. The minimum price for 98 to 99 per cent aluminium ingots and billets was fixed according to the following scale:

fr.2.90 a kilogram for 1 ton to 5 tons
fr.2.85 a kilogram for 5 tons to 10 tons
fr.2.80 a kilogram for 10 tons to 50 tons
fr.2.75 a kilogram for 50 tons upwards

Surcharges were provided in the case of quantities of less than one ton and for metal of a higher degree of purity.

The basic price for sheets of a thickness of one millimeter and up was fixed at 3.40 francs a kilogram.

No price rise could be decided by the committee without the approval of the Société Anonyme pour l'Industrie de l'Aluminium (Neuhausen) and the British Aluminium Company.

Reductions in prices were authorized for *special uses* and in case of absolute necessity.

Penalties. Each contracting company was required to make a guarantee deposit, and a system of fines up to 60,000 francs was provided in case of violation by any of the companies.

The operations of the Aluminium Association were redefined in an agreement dated June 28, 1902. This functioned satisfactorily and was renewed on April 5, 1906, when a contract was signed between the same companies. In the meantime, the Royal Aluminium Company (Canada) had become the Northern Aluminium Company. The new Association, which kept the name of the Aluminium Association, defined its aims as being to "safeguard the common interests" of the associated companies in the sale of aluminum and to "promote the use of the metal." This new agreement came into force on January 1, 1907 and was to expire on December 31, 1911.

The marketing regulations were modified by removing France from the list of reserved markets. Neuhausen remained sole distributor, but delegated a part of its operation as follows: to the *Northern Aluminium Company* for North and South America, the West Indies and the Philippines; to the *British Aluminium Company* for the British Isles, the East Indies, the South African colonies, and Rhodesia; to the *French companies* for France and her colonies.

The quantities to be delivered on the free market were allocated among the interested companies according to the following percentages:

Total sales of	Neuhausen	Northern	British	French Companies
1 to 5,000 tons	37.44	16.70	15.86	30.00
5,001 to 10,000 tons .	35.52	17.24	17.24	30.00
10,001 to 15,000 tons .	33.92	18.33	18.75	29.00
15,001 to 20,000 tons .	31.66	19.46	19.88	29.00
20,001 tons and over ..	29.56	20.72	20.72	29.00

Prices for 98-99 per cent aluminum were fixed at the same level as in 1901. (See page 11.)

Provision was again made for surcharges in the case of deliveries of less than one ton and for aluminum content higher than 99 per cent.

These prices could be either raised by the unanimous decision of the committee or lowered in special cases by each company, but in any event sales at reduced prices could not exceed 10 per cent of the total sales on the free market.

The same conditions for deposits and guarantees and the same provisions in cases of violation of the rules as provided in the agreement of 1901 were applicable.

Differences of opinion regarding prices brought about the dissolution of this Association. Prices rose from 2.75 francs per kilogram in 1906 to 3.50 francs and even temporarily to 4 francs in 1907. This great increase in prices and in profits induced outsiders to develop greatly their productive capacity. In such a situation Neuhausen proposed to limit net profits to 10 per cent and to lower the price to 3 francs a kilogram. In October 1907 the price was reduced to 2 francs a kilogram.

At the beginning of 1908, the French group requested a new price reduction to 1.75 francs or 1.50 francs. As no agreement could be reached on these figures, the

French group asked for the dissolution of the Association. This dissolution took place on April 9, 1908.

II. PERIOD OF TRANSITION

With the dissolution of the Aluminium Association in 1908, the organization of the international market was suddenly destroyed and brought back almost to the stage in which it was in 1900, that is, on the eve of the first cartel. During this period, numerous competitors had developed, and this situation brought about a bitter price war.

Among the new competitors were the following:

La Société Italienne pour la Fabrication de l'Aluminium (SIFA) (Italian Aluminum Manufacturing Company), plant at Bussi;

La Société des Forces Motrices de l'Arve (The Arve Power Company), founded in 1895, plant at Chedde (Haute-Savoie);

La Société des Produits Electrochimiques et Electrométallurgiques des Pyrénées (Pyrenees Electrochemical and Electrometallurgical Products Company), founded in 1907, plant at Auzat;

La Société d'Electro-Chimie (The Electro-chemical Company), plants at Premont, Clavaux, Vallorbe, and Martigny (Switzerland);

l'Aluminium du Sud-Ouest (Southwest Aluminum Company), founded in 1906, plant on the Neste d'Aure (Pyrenees);

La Société Electrométallurgique du Sud-Est (Southeast Electrochemical Company, subsidiary of the preceding corporation, established in 1907, plant at Venthon, near Albertville, Savoie;

The Anglo-Norwegian Company, founded in 1907, plant at Vigeland (Norway);

The Aluminium Corporation, an English company founded in 1907, plant at Wallsend-on-Tyne (near Newcastle);

Giulini Brothers.

The last-named company was the sole serious competitor existing in 1906, at the time the Aluminium Association agreement was renewed. It owned a plant at Ludwigshafen, a majority holding in Martigny, and interests in other companies (*Société des Forces Motrices et Usines de l'Arve*, *Société des Produits Chimiques et Electro-métallurgiques des Pyrénées*).

It seems highly probable that if the Aluminium Association had, as requested by the French group, lowered prices by agreement in the spring of 1907 none of the competing companies, except perhaps the last, would have grown substantially.

The seriousness of the competition which developed in the international market is evident from the fact that, in 1908, at the time of the dissolution of the Association, the production of the competing companies amounted to about 7,300 tons a year, while the sales of the Aluminium Association reached only 4,700 tons. The production of the outsiders thus represented 60 per cent of the total.

The great over-production brought about by the policy of excessive prices established by the first cartel resulted, during the years which followed, in a sharp fall in prices to a level definitely below the costs of all producers, if one includes in the costs, as it is necessary to do, not only the expenses of manufacture (raw materials and labor) but also charges on the capital invested, which are particularly high in the aluminum industry. This is especially true in the general case in which the producers do not purchase electric current but utilize the current produced by their own hydroelectric plants, which have been erected at heavy expense.

As might be expected during these years of cut-throat competition, the financial situation of all producers, especially the new ones, who had not had time to build up reserves, was extremely precarious.

III. THE SECOND CARTEL: ALUMINIUM ASSOCIATION, (1912-15)

After several fruitless attempts, proposals for a new association were worked out at meetings held on the 1st, 2nd and 28th of April 1912, and a final agreement was reached on June 10, 1912. The object of the Association was to regulate the sales of aluminum, outside the United States, through the exchange of all the commercial information in the possession of the members. Sales covered by this agreement included not only raw metal and semifinished products but finished products as well.

The membership included:

Aluminium Français,
British Aluminium Company, Ltd.,
the Anglo-Norwegian Company,
Société pour l'Industrie de l'Aluminium, Neuhausen,
Northern Aluminium Company,
Aluminium Corporation,
Societa Italiana per la Fabbricazione dell' Alluminio.

The new French company, Aluminium Français, had been formed on December 20, 1911. This new company was entrusted with the sales of all French producers and was henceforth their representative within the Association.

The duration of the Association was fixed at ten years, beginning on January 1, 1913 and ending on December 31, 1922. However, there was a clause providing for

renunciation of the agreement on 12 months' notice at the request of three of the four following producers acting together: Aluminium Français, Neuhausen, British, Northern, or of two of these producers with the unanimous agreement of all the other manufacturers.

Furthermore, if during two consecutive years starting from January 1, 1914 the total quantities actually delivered to customers by the Association were lower than 65 per cent of 48,000 tons² (or 31,200 tons), any member company had the right to withdraw.

Organization. The Association established the following bodies: General Assembly, Committee, Central Office, Control Office.

The management of the affairs of the Association and the general supervision of the Control Office were entrusted to a committee of five members nominated by the General Assembly.

The number of votes and the sales quotas for each participant were established as follows:

Company	Votes	Quota (Per Cent)
Aluminium Français	39	38.9 ³
Neuhausen	22	21.4
British	16	16.0
Northern Aluminium	16	16.0
Anglo-Norwegian	4	3.9
Soci�ta Italiana	3	1.9
Aluminium Corporation	3	1.9
	<hr/> 103	<hr/> 100.0

² This figure corresponds to the productive capacity of all the members.

³ The very high quota allocated to the French group was due to its possession of a new patented process (called the Serpek) which appeared very important in the laboratory and experimental stages but which, in spite of continual and costly efforts both in France and the United States, never reached the stage of industrial production.

Marketing regulations. Unlike the first cartel, every member company could sell its quota *where it wished* and directly to its customers.

Prices. The standard price and terms of sale were established by the General Assembly by a majority of 63 out of 103 of the votes either present or represented. This price had to be strictly adhered to as a minimum, but every member had the right to increase it up to 15 per cent at his discretion.⁴

In order to ensure that the agreement was strictly adhered to and in particular that the penalties fixed by the Committee were applied, every member company was required to make a guarantee deposit according to its allocation. The members agreed, in addition, to acquire no interest, either direct or indirect, in an aluminum plant which was not bound by the contract of June 10, 1912, and it was forbidden, moreover, to buy aluminum from or sell it to another manufacturer except through the Committee. In addition, sales of alumina to outsiders were forbidden.

As soon as this agreement was reached, the first General Assembly of the new cartel met. The standard minimum price was fixed at 1,500 marks, or £75, or fr. 1,850 for one ton of aluminum ingots of 98 to 99 per cent. At the General Assembly of August 12, 1912, the price was raised to fr.2,000, or £80, or \$400 a ton for contracts of 10 to 50 tons. The price of £80 (2 francs a kilogram), which corresponded to the lowest price in

⁴ This permissible increase was reduced one year later to 10 per cent. For deliveries exceeding 50 tons, a special reduction was authorized which could not, however, exceed 1 per cent.

force in 1907 under the first cartel, remained effective until the cartel was dissolved.

Dissolution. The operations of the cartel were interrupted by the declaration of war in 1914, and on January 23, 1915 the dissolution was officially registered by a letter from the chairman of the committee to the different members.

During the war period, it was of course quite impracticable to maintain an international cartel organization, especially when enemy countries were involved. In any case the intense war demands for aluminum products coupled with government price regulation, would have rendered unnecessary the operation of a cartel arrangement.

CHAPTER III

THE THIRD OR EUROPEAN CARTEL

After the first World War, the situation underwent a great change. Certain countries, including France, had greatly expanded their productive capacity in order to meet the needs of national defense. Others had created a whole new aluminum industry within their own borders. Such was the case in Germany, which was badly situated economically for the production of aluminum, but which nevertheless constructed several new plants that were government owned or built at government expense. The stocks of metal accumulated by manufacturers working for the armed forces were huge. Some time was required in order to re-establish equilibrium. Hardly had this point been reached when the crisis of 1921 intervened. As a result, European producers of aluminum began once more to seek the advantages to be obtained by co-operation and proceeded to an exchange of views on the future of the industry.

I. PRELIMINARY AGREEMENT ON PRICES

A preliminary understanding, limited to prices, was reached in 1922. A definitive agreement was concluded at Zurich on October 15, 1923, at a general conference of aluminum producers which included the Canadians but not the Americans. The following minimum prices were agreed to:¹

¹ As we shall see later, these prices, though substantially higher than those of the second cartel, were nevertheless very moderate in view of

£100 a ton for 98 to 99 per cent metal
 £112 a ton for 99 per cent metal
 £115 a ton for wire bar

These prices were applicable to sales made up to June 30, 1924. A special price of £105 a ton was provided for in the case of cables. It was quickly recognized however, that an agreement limited to prices was not really effective, and accordingly negotiations were started in order to re-establish a more complete cartel similar to that which had functioned with success before the war of 1914.

II. THE AGREEMENT OF SEPTEMBER 11, 1926

On this date a meeting of *European* companies was held in Paris, which included the following:

Aluminium Français,
 British Aluminium Company,
 La Société Anonyme pour l'Industrie de l'Aluminium
 (Neuhausen),
 German group: Vereinigte Aluminium Werke; Erft-Werke
 A.G.; and Aluminium-Werk G.m.b.H.
 Bitterfeld

They undertook to form an association with the object of regulating their sales, developing the use of aluminum by all possible means, supplying to their customers the quantities and qualities of metal desired, and reducing transportation outlays and overhead costs to a minimum.

The Aluminium, Ltd. (Canadian), which had just

the general price inflation that had occurred. They represented a *considerable drop* compared with the prices in force during the period of competition which followed the end of the war.

been organized to take over all the subsidiaries of the Aluminum Company of America in Canada and Europe, was expected to participate in the new cartel. But in fact this company did not participate in the agreement.

The agreement covered not only the raw metal but also *semifinished products* and *finished products*. The cartel thus constituted took the name of the *Aluminium Association*.

Organization. The organization was identical with that of the prewar cartel, including a general assembly, committee, central office, and control office.

The participants had the following voting rights: Aluminium Français, 331; British, 160; Neuhausen, 238; German group, 271. In order to be valid, a decision of the General Assembly had to be supported by at least half the votes. Otherwise, a new assembly was convoked under the conditions laid down, and it could reach a valid decision whatever the number of votes present.

The function of the *Committee* was to manage the affairs of the Association and the operation of the central office. It was composed of four members appointed by the General Assembly.

The *Central Office* was the executive organ for carrying out the decisions reached by the General Assembly and the Committee. At its head was a secretary-general appointed by the General Assembly, while his assistants were appointed by the Committee on the nomination of the secretary.

Inspection was carried out by delegates appointed by the Committee.

Quotas. The agreement provided for the allocation of *sales quotas* to each member. The initial method of fixing them was based on the deliveries *made by each producer during the year 1925*. From these figures, the following allocation was arrived at:

Aluminium Français	33.1	<i>per cent</i>	or	35,366	tons
British	16.0	"	"	17,007	"
Neuhausen	23.8	"	"	25,426	"
German group	27.1	"	"	28,937	"
<hr/>		<hr/>			
Total	100.0	"	"	106,736	"

These quotas were to be in operation up to December 31, 1928.

The function of the Committee was to take all necessary measures to bring the sales of each member effectively into line with the quota allotted to it. The Committee could ask any member who seemed to be ahead of his quota to hand over orders to those of his associates who were in arrears. If this solution were not possible the member concerned was required to buy aluminum from members who were behindhand up to the amount of excess sales at the standard minimum price.

From the point of view of sales, the basic rule was that every member could sell his quota where he wished and without the intervention of any designated agent. In this way, the principle of *direct contacts* of each of the members with his customers was maintained.

The sales that members made in the United States were subject to no restriction. There were neither quotas nor fixed prices.

Without authorization from the Committee, the members were forbidden to acquire interests in other

aluminum companies which were not members of the cartel, to sell aluminum to or buy it from another manufacturer who was not a member, or to sell alumina to nonmember producers.

Guarantees and penalties. In order to assure the smooth functioning of the Association, a system of guarantees and penalties was provided, and each member had to deposit with the Central Office on October 1 of each year at the latest a number of bank acceptances of 50,000 Swiss francs each. This deposit was intended to guarantee the fulfillment of the obligations of the members, especially of the payment of the penalties which the Committee might impose for infraction of the agreement of September 11, 1926.

As was the case with other cartels where such deposits were required, the Association never found it necessary to have recourse to these guarantees in order to compel members to fulfill their obligations.

Prices. Standard prices and terms of sale were fixed by the Committee, with each member retaining the right to sell at a maximum of 15 per cent above standard prices, which were regarded as a minimum, if he considered it to be to his advantage. If circumstances justified it, special official prices might be established for a particular country and for a fixed period of time. In urgent cases the Committee could authorize members to undertake large contracts at special prices and on special terms. However, the special prices thus agreed to had to be communicated to all members as soon as possible.²

In 1926, before the cartel was established, the price of aluminum was £118 a long ton. The first act of the

² I shall return in Chap. 7 to the question of price differentials.

Association was to reduce the price on September 11, 1926 to £105 a long ton. This price, which was the standard minimum price, was for delivery to consumers' plants exclusive of customs duties and without discount.

It remained unchanged until May 18, 1928, when it was lowered to £95 a long ton. On October 15, 1930 it was reduced to £85 a long ton.

As was provided in the contract, however, these minimum prices could, in special cases, be modified by the Committee. Thus, at a meeting held on September 11, 1926, a rebate of £5 a ton was authorized for metal intended for the construction of electric power lines.³

Another example of the policy adopted by the Aluminum Association in order to encourage the development of new markets can be found in the authorization given to the *French* producers to grant a rebate on deliveries to the automobile industry. A similar measure was adopted in the case of the *German* automobile industry, which was allowed a rebate of £10 a ton on December 14, 1928.

In order to encourage exports both of semifinished and finished products, members were authorized to give to rolling mills or manufacturers of finished products a rebate of £12 a ton for products which they could prove had been exported.⁴

Duration. The contract did not fix any termination

³ This rebate was later increased to £10 a ton.

⁴ This was intended to equalize the position of the producers and the fabricators in the export market. All the producers of raw aluminum were at the same time producing sheets or semifinished products in their own plants, and since they used aluminum made by themselves, they benefited in comparison with the fabricators by the margin of profit on the raw aluminum. This rebate made it possible for the fabricators to take their place in the export market.

date. Instead, it was provided that, at the end of the second year of operations, namely, December 31, 1928, every producer who desired to do so should be at liberty to withdraw. At the General Assembly of the Aluminium Association held in Paris on September 5, 1928, this question came up on the agenda, and it was decided unanimously to extend the contract to December 31, 1931.

III. AGREEMENTS WITH NONMEMBERS

Besides making basic agreements between the members, the cartel tried to bring order into the aluminum market by making contracts with certain small outside companies such as Lissauer, the sales agent of the Steeg plant in Austria, Mermod, the Aluminium Corporation, and Giulini, from whom the cartel producers bought alumina.

An important commercial contract was signed between the group of European producers and Aluminium, Ltd. (Canadian) for the organization of sales of aluminum in Japan.

The "Japanese" agreement, signed at Zurich on July 18, 1930, provided that the two above-mentioned groups should participate in the sales of aluminum in the Japanese Empire and its dependencies at a ratio of 52 per cent for Aluminium, Ltd. and 48 per cent for the European producers. The products covered by these quotas extended to all importations of virgin aluminum and aluminum alloys, as well as finished products and scrap. Aluminium Ltd. was appointed the exclusive sales agent for products exported to Japan by the European

producers and was alone authorized to fix prices and terms of payment and delivery for sales to Japan by the contracting parties. That part of the Japanese market which was reserved for the European producers was divided between them in the following proportions:

Aluminium Français	25 per cent
British Aluminium Co.	5 " "
V.A.W.	20 " "
Neuhausen	50 " "

In connection with delivery and payment, it was provided that the metal to be imported should be put at the disposal of Aluminium, Ltd. c.i.f. Japanese port, ex. customs duties. Aluminium, Ltd. undertook to pay the European producers for the metal at the market price fixed by Aluminium, Ltd. for Japan, less a sales commission of 2 per cent for virgin, alloy, and scrap metal, 3 per cent for semifinished products, and 5 per cent for finished products, including cables.

Each party had the right to deliver to Japan semifinished and finished products in proportion to their respective quotas, the sale being assured by Aluminium, Ltd., and the price to be paid by the latter being that at which the orders would have been accepted. The European producers kept the right to participate in the supply of metal intended for the manufacture of cables.

It was understood that the representatives of Aluminium, Ltd. and all the European producers in Japan would establish a joint office for the study of commercial and technical questions concerning the Japanese market.

All disputes arising out of the operation of this agreement were to be settled by arbitration according to the

rules of the Arbitration Court of the International Chamber of Commerce.

The duration of the contract was five years from January 1, 1931. It was provided that, unless the agreement was denounced by one of the signatory companies by giving one year's notice, it would be extended for a further period of five years, and so on.

IV. EFFECTS OF THE THIRD CARTEL ON THE INDUSTRY

Though the sales of the different members sometimes varied to a fairly considerable extent from year to year, experience showed that, except during a general crisis as in 1921 or 1930, the sales of *all* the European producers rose steadily. Total sales of all cartel members developed at a much more constant rate than those of any individual producer.

The effect of quotas in minimizing the importance of national economic crises operated at one period to the advantage of France and at another to the benefit of Germany. In 1927 certain French industries, such as the automobile industry, which were large consumers of aluminum, suffered a severe crisis following the stabilization of the franc. The aluminum industry was seriously affected, and the sales of Aluminium Français amounted to only 16,928 tons at a time when, according to its quota of the total sales (76,717 tons), it would have had the right to deliver 25,394 tons. In the same year Germany, whose industry had just been re-equipped, was going through a period of prosperity and sold 28,000 tons, although its quota was only 20,800 tons. As a result of the agreement, Aluminium Français

was able to deliver 4,400 tons of metal to Germany and 800 tons to Switzerland, or 5,200 tons additional, which brought up the total French deliveries from 16,928 to 22,170 tons.

Four years later, the situation was reversed. Germany suffered a period of great depression. Deliveries were in arrears by 1,250 tons of its quota. It therefore delivered 1,059 tons to Aluminium Français and 156 tons to the British Aluminium Company.

The absence of the Canadian producer from the Association, however, was a serious defect in the organization of the cartel. This disappeared with the establishment in 1931 of the fourth international cartel, the Alliance Aluminium Company.

CHAPTER IV

THE FOURTH CARTEL (ALLIANCE ALUMINIUM COMPANY, 1931-36)

At the twenty-second meeting of the committee of the third cartel, which was held in Brussels on June 2, 1930, it was unanimously agreed that the question of the extension of the agreement beyond the year 1931 was subordinate to the question of a fundamental reorganization of the Association. It was considered that this reorganization ought to establish joint financial and technical interests among the member producers and allow rapid and effective action. The different European producers soon reached agreement among themselves.

As it was desired to have the participation of the Canadian producer, it remained to reconcile the European point of view with that of the Canadian. With this end in view, a preliminary meeting between representatives of some of the European companies and representatives of Aluminium, Ltd. was held in Montreal in April 1931. This meeting was succeeded by two conferences in May 1931, one in London and the other in Paris, at which substantial accord was reached.

It should be stated here that the Aluminum Company of America did not participate in any of the aluminum cartels with which the author was associated. While shareholders of the Aluminum Company of America own a majority of the shares of stock of the Aluminium Company, Ltd. of Canada, the latter is not a subsidiary corporation. Moreover, officials of Alcoa did not partici-

pate in the negotiations between the European groups and the Aluminium Company, Ltd. None of the agreements contained restrictions of any sort pertaining to sales to or exports from the United States. Nor were there any secret understandings between Alcoa and the Alliance with respect to markets or otherwise.

I. THE ORGANIZATION

On July 3, 1931, three documents, which together formed the basis of the new cartel, were signed in Paris between the following producers:

French	Cie. Alais Froges et Camargue, Société d'Electro-Chimie	} Represented by Aluminium Français
Swiss	Société Anonyme pour l'Industrie de l'Aluminium— Neuhausen	
German	Vereinigte Aluminium Werke, Aluminium Werke Bitterfeld, Aluminium Rheinfelden (subsidiary of Neuhausen)	
English	The British Aluminium Company	
Canadian	Aluminium Company of Canada, Toronto—repre- sented by Aluminium Ltd., Montreal	

Indirectly the following subsidiary companies were also connected with the organization.

Spanish	Aluminio Español
Swedish	Svenska Alluminiumkompani A B (Norsk Aluminium Co.)
Certain Norwegian	Norsk Aluminium Co. (for one half) International Aluminium Co. (Haugvik)
Certain Italian	Aluminium Corporation Ltd. Sta. Italiana dell' Alluminio, Sta. Alluminio Veneto Anonima, Alluminio Italiano

The documents comprised a basic memorandum,¹ a provisional agreement regulating production and stocks, and a supplement to the basic contract. The contract provided for the establishment of a company called the Alliance Aluminium Company. The avowed purpose was to develop the market for aluminum and to perform such other functions as might be desirable to bring within its sphere of activity. The authorized capital was provisionally fixed at 2,600 shares, called "A" shares, of which only 1,400 shares would be issued immediately to the founders. These 1,400 shares were divided among the producing companies on the basis of relative sales in recent years. The European companies and their subsidiaries (group 1) received an aggregate of 1,000 shares. Canadian producers and subsidiaries (group 2) received 400 shares. The division worked out as follows:

Aluminium Français	299	shares, or	21.36	<i>per cent</i>		
Aluminium Industrie Neuhausen ..	216	" "	15.43	" "		
Aluminium Ltd.	400	" "	28.57	" "		
British Aluminium Company	210	" "	15.00	" "		
German group ...	275	" "	19.64	" "		
<hr/>						
Total	1,400	" "	100.00	" "		

Provision was made, moreover, for the issue of 1,200 supplementary rights, authorizing, under certain conditions, the subscription to a like number of A shares. Two hundred of these rights could be subscribed by the following companies forming group 3:

Aluminium Corporation Ltd.
International Aluminium Company Ltd. and A. S. Haugvik
Smelteverk

¹ Known as the "A.A.C. Contract."

Elektrizitätswerke Stern et Hafferl A. G.

Societa Italiana dell' Alluminio

Alluminio Italiano

Aluminio Español

Usine d'Aluminium Martigny S.A., ½ Norsk Aluminium-kompani

The remaining 1,000 rights were to be divided equally between the European and Canadian groups, thus stepping up considerably the Canadian percentage. This was in recognition both of the low cost of production of the Canadian producer and the prospect for an early expansion of output.

These rights were not, however, convertible into shares as long as the Alliance Aluminium Company had not reached an annual production exceeding 100 tons for each A share. In addition, it was provided that if the output should subsequently fall below 100 tons, the production rights of the supplementary shares would be reduced.

The sale of shares to outsiders could be made only with the consent of at least three quarters of the A shareholders. Transfers between A shareholders, however, required no authorization. Furthermore, an A shareholder could not sell any of his aluminum plants if he did not give up to the purchaser a certain number of A shares, the buyer then becoming responsible for all the obligations attaching to the ownership of such shares.

All A shares carried with them the obligation on the part of the owner to give the Alliance Aluminium Company the right to fix the maximum production of aluminum attaching to each share and to hand over to the company without compensation any metal produced

beyond this maximum. On the other hand, the Alliance Company undertook for its part not to sell aluminum to or to buy it from any producers other than A shareholders.

Finally, A shareholders were forbidden to participate without prior authorization in any aluminum production by nonshareholders. This prohibition did not exclude transactions between A shareholders.

Because of financial difficulties and the accumulation of excess stocks of aluminum by certain companies, the Alliance Company adopted two important policies concerning stocks: first, it was provided that only 25 per cent of the A shares need be paid for in cash, the balance being paid later in the form of warrants for the delivery of aluminum; second, the Alliance Company agreed to purchase from producing companies aluminum stocks in excess of 40 tons for each A share on a moderate price basis.

Unlike previous cartels, the fourth cartel, that is the Alliance Company, adopted the principle of leaving to its members the maximum commercial and industrial freedom compatible with the realization of its objects. Regulation was to be imposed only to the extent it proved useful. This principle is affirmed in the following clause of the agreement:

"A" shareholders will be free to produce, transform and sell aluminum in all its forms, including raw metal, semi-finished products and finished products, without any price agreement, territorial limitations or any other regulation, except as provided in the present agreement and as may be enforced by the A.A.C. in accordance with this same agreement. But

nothing prevents the extension of any existing agreement or conclusion of any future agreement between "A" shareholders on prices, the sharing of a given market or the organization of present or future cartels which "A" shareholders or some among them may desire to establish among themselves.

Furthermore, the restraint exercised on its members by the Alliance Company could not be very severe, since each of them had at all times the right to withdraw upon giving six months' notice.

It will be observed that the last sentence in the above quotation reserves the right to the member producing companies to enter into agreements for joint action concerning production and sale. The question may well be asked, Does not this enable the members by agreements among themselves to defeat the major purposes of the cartel?

The purpose of this reservation was to permit the individual member companies to collaborate in stabilization practices which could not be carried out by the Alliance Company alone. It should be understood that it was not intended to give to some of the members of the cartel the right to make agreements with respect to prices, markets, etc; unanimous agreement would be required in accordance with the general policies adopted by the executive committee of the Alliance Company. The provision was, in fact, never employed as a means of dividing markets. As will be seen in Chapter V the few agreements made among some members of the cartel were limited in scope.

The cartel was established at a time when the intervention of the Association in the production by its members was indispensable, since world stocks exceeded six-

teen months' consumption at the rate then prevailing and a prolongation of this state of affairs threatened to endanger the financial situation of most of the producers. It was essential to try to revive a healthy market situation. With this object, and without waiting for the settlement of all the questions under consideration, a provisional agreement was signed regulating production and stocks *up to December 31, 1931*. The definitive text of the statutes was presented at a meeting held at Basle on October 21, 1931. It was decided (1) to have the corporation registered under the Swiss law; (2) to have the head office of the company at Basle; and (3) to limit the capital provisionally to 1,400 shares of 25,000 Swiss francs each. The structure of the Alliance Aluminium Company followed essentially the features of any share company. Its organization comprised: a general assembly, a board of directors, a board of governors, the management, and a control office.

The *Board of Directors* included the representatives of each producer. This board, which was concerned particularly with financial arrangements, established a *board of governors* (Comite de Direction), which was the executive organ of the company, on which the producers from each country were represented by two or three members. The management received its directives from the Board of Directors and the Board of Governors. In order to ensure that members conformed to the rules of the Association, the well-known firm of Price Waterhouse and Company was entrusted with carrying out a detailed inspection of plants, manufacture, stocks,

sales, and accounts, and presented an annual report on the subject. A control commission appointed by the Board of Governors was entrusted with studying this report and presenting its conclusions to the board.

II. FUNCTIONS OF THE ALLIANCE ALUMINIUM COMPANY

By fixing the production rights for each share, the Alliance Company was able to exercise constant control over the whole of the *production* by its members. Furthermore, although it did not fix *prices* directly, the cartel, by means of the control which it exercised over production and stocks, was able to regulate prices in an effective manner.

How was it possible in practice to solve the two aspects of the problem, production and prices?

Buying up of excess stocks. When the Alliance Company was established in 1931, producers, in consequence of the acute depression, were handicapped by large stocks which they could not dispose of. On July 31, 1931 the stocks of producers who were members of the cartel stood at 91,146 tons, or almost 35 per cent of the maximum world productive capacity (including the United States), at a time when consumption had fallen very low.

The first task of the Alliance Company was to buy the excess stocks. The purchase price was fixed rather low—£55 a long ton, or in American currency, 12.33 cents a pound. The whole operation involved nearly 88 million Swiss francs. Financing this operation required substantial credits, which were granted partly by the

banks, partly by some of the members themselves. Twenty-five million Swiss francs were borrowed from the following banks in 1932:

Bankers' Trust Company of New York	5 millions
Société de Banque Suisse	10 "
Credit Suisse	10 "

In addition, certain shareholders made large contributions. Aluminium Français, acting on behalf of the Compagnie Alais Froges et Camargue, granted a loan of 3 million Swiss francs in March 1933, which was increased two years later to 5 millions and which was repaid in 1936. Over the same period, Neuhausen also loaned 5 million Swiss francs to the Alliance Company.

This collective effort of the whole aluminum industry which aimed at strengthening the financial condition of each of the members, met with complete success.

Regulation of production. The production rights attaching to each share had been fixed provisionally on July 3, 1931 at 40 long tons a share for the second half of 1931. This was an annual rate of 80 tons a share, equal to 80 per cent of the production rights initially attaching to A shares. In face of the continued crisis in consumption and the continued increase in stocks, it was necessary to take much stronger measures to rehabilitate the industry. The variations in production rights were as follows:

Date of Decision	Period Covered	Metric Tons Annually per Share
July 3, 1931	Second half, 1931	80
October 21, 1931	First half, 1932	70
March 5, 1932	Year, 1932	57.5
June 1, 1932	First half, 1932	57.5
June 1, 1932	Second half, 1932	50

October 6, 1932	Year, 1933	50
May 24, 1934	Year, 1934	55
September 26, 1934	Year, 1935	53
October 18, 1935	Year, 1936	70
October 1, 1936	Year, 1937	85
December 11, 1936	Year, 1937	100

Buying and selling prices of the Alliance Company.

The Alliance Company was obliged on request to buy the excess stocks of its members at a price fixed in advance, and in addition to sell its own stocks to members who needed them, also at a fixed price. These prices were fixed at regular intervals by the Board of Governors. The purchase and sale prices applied by the Alliance Company from the time of its establishment are given below:

Purchase Price from Members (per metric ton)	Sale Price to Members (per metric ton)
November 1931, £55 gold	October 21, 1931, £57.10 gold
December 1, 1931, £70 gold	December 1, 1931, £77 gold
unchanged 1933 { " "	March 4, 1932, £70 gold
{ " "	March 31, 1932, £71 gold
{ " "	June 30, 1932, £72 gold
	August 31, 1932. Shareholders had to buy 8 tons a share at £70 a metric ton.
	September 30, 1932 £73 gold
January 1, 1933, £71 gold	January 1, 1933, £73 gold
	September 22, 1933. Shareholders obliged to buy 2.5 tons a share at £71 gold a ton; in default of buying, they had to pay an indemnity of £15 gold for each ton below this figure.
July 1, 1934, £68 gold	May 24, 1934. £70 gold after July 1, 1934.
September 26, 1934, £63 gold	September 26, 1934. £67 gold after October 1, 1934.
December 11, 1934, £58.10 "	December 11, 1934. Shareholders were obliged to buy 4 tons of metal a share or 3 tons with a payment of £15 for each ton not bought.
	January 1, 1936, £62.10 gold a ton.
	February 14, 1936. Shareholders to buy 4 tons a share at £62.10 gold.
	October 1, 1936. It was provided that the settlement for the purchase of 4 tons in 1936 would be made in devaluated francs at the rate of 1,650 Swiss francs a ton, with an indemnity of 500 Swiss francs a ton for purchases not made.
	October 1, 1936, 1,600 Swiss francs a ton.

June 16, 1937, 1,500 Swiss fr. a ton
 During 1938, since stocks were no longer exercising any pressure on the market, no purchases were envisaged. However, the purchase price was maintained theoretically at 1,000 Swiss francs a ton (Oct. 12, 1938), then at 1,100 Swiss francs a ton (Feb. 17, 1939).

June 16, 1937, 1,700 Swiss francs a ton.
 December 15, 1937, 1,750 Swiss francs a ton.
 June 30, 1938, 1,650 Swiss francs a ton.

October 12, 1938, 1,600 Swiss francs a ton.

The cartel as a regulator. Prices were fixed on the following principle: a low purchase price paid by the cartel brings about a lowering of prices in the market and a diminution of production, while a high purchase price brings about a rise in price on the market and an increase in production.

The operation of this principle made it possible to adjust market prices quickly in the light of changing conditions. But it must not be thought that the regulator functioned automatically. To be attractive, the *sales* price of the Alliance Company had to be very low. If it were not, the producer would prefer to produce his metal in his own plant as long as his selling price covered the cost of raw materials and labor. At the same time, the *purchase* price of the Alliance Company had to be high, for otherwise the producer would prefer to lose £5 a ton in order to gain or keep important customers. This is what happened particularly in the United States where, during the period 1934 to 1937, the European producers sold at a price which, after deduction of customs duties, left them a net sales price lower than the purchase price of the Alliance Company. This is shown in the table below:

	1934	Cents a Pound		1937
		1935	1936	
Purchase prices of the Alliance Company (average)	25.26	21.75	21.79	21.86
Alcoa prices (after deduction of 4 cents for customs duty) . . .	18.5	15.49	15.00	15.84

On the other hand, during periods of shortage of metal, producers bought freely from the Alliance Company even at high prices, in the same way as they willingly sold to it even at low prices during periods of depression.

On the whole, and in spite of the defects which have just been pointed out, the system showed itself to be flexible and effective.

Stabilization of prices through the operations of the Alliance Company may be divided into two periods. The first was from 1931, when the cartel was established, up to 1936; the second began with the reorganization of the cartel in 1936.

The first might be called the period of rehabilitation of the market. It was marked above all by a reduction of stocks. By means of a detailed regulation of buying and selling prices, aided by some business recovery, the total stocks of the Alliance Company and its members were reduced from about 110,000 tons in 1931 to 59,000 tons in 1936, a reduction of almost 50 per cent. An energetic policy was pursued to induce members to co-operate in bringing about this reduction.

By contrast, from 1936 onward, as we shall see in the following chapter, the organization of the Alliance Company tended rather to take on a co-operative character. Following its reorganization, it began to allow its members more freedom of action. Because of the reduction of stocks and the resultant decline in the volume of purchases and sales made by the Company, producers found it easier to dispose of their metal. In this period, therefore, the idea of control simply by means of royal-

ties, which we shall discuss further on, gradually superseded the idea of control through the difference between the purchase price and the sales price of the Alliance Company.

The following table shows the changes in stocks in relation to commercial needs:

STOCKS IN HALF-YEARLY PERIODS OF THE ALLIANCE ALUMINIUM COMPANY AND ITS MEMBERS, EXCLUDING WORKING INVENTORIES*

Date	Stocks of the Alliance Aluminium Company (Tons)	Total stocks of the Alliance Aluminium Company and Its Members (Tons)	Calculated in Months of Sales of the Members of the Alliance Aluminium Company
December 1, 1931.....	27,100	111,653	13.25
June 1, 1932.....	44,000	107,590	16.00
December 1, 1932.....	31,500	106,295	14.00
June 1, 1933.....	36,700	104,865	15.75
December 1, 1933.....	35,600	98,897	11.80
June 1, 1934.....	35,500	86,759	9.00
December 1, 1934.....	28,500	83,496	7.50
June 1, 1935.....	29,700	72,812	5.70
December 1, 1935.....	22,800	72,814	4.50
June 1, 1936.....	20,700	68,108	4.20
December 1, 1936.....	18,300	61,608	3.00
June 1, 1937.....	5,200	50,811	2.25
December 1, 1937.....	12,956	52,880	2.00
June 1, 1938.....	11,798	65,398	2.25
December 1, 1938.....	7,419	64,880	2.00
June 1, 1939.....	5,792	56,318	1.50

* The working inventories are those which are in the producing plants or are being assayed, or which are in course of transport between the producing plant and the warehouse, or between the producing plant and the transforming plant (rolling mills, foundries, etc.).

The years 1938 and 1939 naturally reflect the expanding requirements of the governments for war purposes.

III. SALES IN THE UNITED STATES

As there was no restriction on sales territories, there was no issue about national markets being reserved, as opposed to export markets, which were free.

In this connection, the United States market presented a special interest. At the time of the action against the Aluminum Company of America for violation of the antitrust laws, the United States Department of Justice had pronounced the opinion that, since the establishment of the cartel, the sales of European producers in the American market showed a decline. Such an assertion is not in accordance with the facts. The following table gives, on the one hand, the total sales of the cartel in the United States and, on the other hand, the *percentage* represented by these sales *in relation to those of Alcoa*.

Year	Total Sales of the Cartel in the United States (In millions of pounds)	<i>Percentage in Relation to Alcoa Sales</i>
1931 (last half)	5.0	6
1932	6.0	1
1933	15.0	18
1934	15.5	18
1935	16.0	13
1936	22.5	10
1937	21.0	6
Average 1931-1937	17.5	10.3

It will be seen that the sales of the cartel increased both in aggregate and percentage terms. Moreover, after 1932, the percentage sold by the cartel was much higher than in the four years prior to the establishment of the Alliance Company. From 1928 to 1931, sales by the cartel in relation to sales by Alcoa ranged from 4 to 9 per cent, averaging 6.5 per cent. It should be added here that

cartel sales in the United States declined in 1938-39 in consequence of the great European demands arising from developing war programs.

Much confusion with respect to this phase of the problem has arisen from a failure to recognize that the decline in foreign trade in aluminum between 1929 and 1932 was simply a result of the world depression which

COMPARISON OF UNITED STATES FOREIGN TRADE IN ALUMINUM
AND IRON AND STEEL, 1928-37
(In thousands of dollars)

Year	Production of Primary Aluminum	Aluminum and Products		Iron, Steel, and Products	
		Imports	Exports	Imports	Exports
1928.....	47,899	8,873	6,891	34,746	184,445
1929.....	51,864	10,860	7,971	38,184	204,920
1930.....	50,961	5,286	7,122	27,627	141,628
1931.....	37,284	3,211	2,855	18,332	64,846
1932.....	20,543	1,822	1,452	11,161	29,075
1933.....	16,174	3,212	1,329	11,932	46,178
1934.....	14,094	4,038	2,381	13,620	90,921
1935.....	22,070	4,279	2,067	20,032	90,318
1936.....	41,612	5,181	1,609	26,792	113,822
1937.....	55,609	8,178	2,943	29,961	304,125

demoralized all trade. Official American trade figures show clearly that fluctuation in the exports and imports of aluminum did not differ materially from fluctuations in the trade in industrial products as a whole. Moreover, there is a close parallelism between the foreign trade in aluminum and that in iron and steel, as shown by the table above. The table also gives the annual production of aluminum in the United States.

Between 1929 and 1932 aluminum imports declined by 83 per cent and exports by 84 per cent. In the case of

iron and steel, imports declined by 70 per cent and exports by 86 per cent. In view of the devastating effects of the depression in all countries, it is idle to suppose that any industry could have maintained capacity production by expanding exports to foreign countries.

CHAPTER V

THE NEW POLICY OF THE ALLIANCE COMPANY, 1936-39

From the time the Alliance Company was established, Mr. Edward Davis, Chairman of the Board of the Canadian Corporation, Aluminium Ltd., frequently drew attention to the fact that it was the intention of its founders that the right given to the Alliance Company to fix production quotas for the different members should be neither compulsory nor permanent. It was to be simply a method by which it could intervene in order to re-establish healthy market conditions during periods of crisis and when other more effective means were lacking.

Considering that such healthy market conditions had in fact been re-established, Mr. Davis, in a letter of June 26, 1935 addressed to the Chairman of the Alliance Company, expressed the opinion that the existing commercial position no longer required the fixing of production quotas for the different members. He suggested that the prohibition on production above the quota should be abandoned and replaced by payment of a royalty to the Alliance Company on the production of each member beyond a certain point and in certain conditions.

Mr. Davis let it be understood that in case of a refusal his company would be obliged to withdraw from the cartel. He summed up his position by saying:

I venture to repeat, on account of its importance to us, the formula on which depends Aluminium Limited's continued observation of the Foundation Agreement. It is that we are constrained to say that we need to have, in every market, in addition to the free hand we have always had to sell as much as we please at whatever price we please, also the right to produce as much as we think best.

In a further letter of January 31, 1936, Mr. Davis again underlined his point of view.

Aluminium Ltd. has little confidence in the durability of an organization which depends too much on restriction of its members, but it will willingly continue to adhere to an organization which by methods freely agreed to attempts to put into operation recommendations which are difficult to apply within the framework of individual action.

He suggested in particular that, in order to avoid the disorganization resulting from free markets, consideration should be given to the adoption in other countries of the system of co-operative sales which had functioned successfully in Japan.

In this way, the lines of development toward a *co-operative form of organization* were laid. The general purpose was to avoid penalizing expansion by individual companies and to develop a common financial interest in such expansion.

This formula was examined in detail at the time of the conference of European producers held in London on July 11, 1935, and was approved in its final form on February 14, 1936, at the twenty-second meeting of the Board of Governors at Zurich.

THE NEW BASIC AGREEMENT, FEBRUARY 14, 1936

The new basic agreement reached at Zurich on February 14, 1936 replaced that of July 3, 1931 and was effective retroactively to January 1, 1936.

Freedom of production. The first principle adopted was that of absolute freedom of production. However, in order to avoid bringing about a situation similar to that which had motivated the establishment of the Alliance Company, provision was made for a *basic production right* fixed, in principle, at a figure between 70 per cent and 100 per cent of the *sales of the last six months* for which the figures were known. Excess production above the figure thus determined was to involve payment of a royalty to the Alliance Company. The scale fixed on *February 14, 1936* for this royalty was as follows (for a basic production right fixed at 70 tons a share per annum):

(£ gold for each metric ton in excess)	Royalty	
	for each metric ton	For Production
		Above Below
		(Metric tons per share per annum)
3		70 80
6		80 90
9		90 100
12		100

Excess stocks. In giving all producers unlimited freedom of manufacture, the Board of the Alliance Company aimed at increasing its commercial activity and the total figure of sales but at the same time avoiding the accumulation of excessive stocks of metal. It was necessary, therefore, to provide for the payment of a royalty to the Alliance Company in case of a systematic increase in stocks which was not justified by commercial

needs. The cartel decided, therefore, to establish a second scale of royalties payable to the Alliance Company, based on excess stocks as follow: £2 (gold) a metric ton on excess stocks at December 31, 1936 above 45 and up to 55 tons a share; £5 (gold) a metric ton on excess stocks beyond 55 tons a share.

On *October 1, 1936* the Board of Governors decided to convert the royalties fixed on February 14, 1936 into depreciated Swiss currency, at the rate of £1 to 25.221 Swiss francs as follows:

Excess Annual Production

Swiss francs 75.66 per metric ton for 70 to 80 tons per share in Alliance Company.

Swiss francs 150.32 per metric ton for 80 to 90 tons per share in Alliance Company.

Swiss francs 256.98 per metric ton for 90 to 100 tons per share in Alliance Company.

Swiss francs 302.64 per metric ton above 100 tons per share in Alliance Company.

Excess stocks at December 31, 1936

50.44 Swiss francs per metric ton for 45 to 55 tons per share

126.10 Swiss francs per metric ton above 55 tons per share

At the meeting of June 19, 1937, by which time a scarcity of metal had developed, it was decided to reduce the royalties and to raise the basic limit for excess production from 70 to 100 tons per share per annum.

Excess Tonnage	Average Royalty per Ton (in Swiss francs)
Above 100 tons and below 115	10
Above 115 tons and below 125	30
Above 125 tons and below 150	50
Above 150 tons	125

The royalties on excess stocks at December 31, 1937 were fixed at 50 Swiss francs a ton for the excess be-

tween 44 and 55 tons and 125 Swiss francs a ton for excess above 55 tons per share.

On February 8, 1938 the Board of Governors decided that the shareholders would not have to pay the royalties provided for on the excess stocks at December 31, 1937. However, royalties were maintained for excess *production* during the period from January 1 to March 1, 1938, at the following rates:

10 Swiss francs a metric ton excess between 28.75 and 31.25 tons per share

50 Swiss francs a metric ton excess between 31.25 and 37.50 tons per share

100 Swiss francs a metric ton excess above 37.50 tons per share.

Finally, on March 4, 1938, as the demand for metal continued to increase, it was decided to abolish all royalties after March 31, 1938. This was the end of the system of royalties.

Export markets. In place of strict and *compulsory* regulation, the aim in 1936 was to reach regional agreements *freely* arrived at between sales agents of the member producers and, if possible, outsiders in order to fix, with due regard to the time and the conditions appropriate to each market, the *basic prices considered as normal* for sales of raw or finished metal. The object of these agreements was to obtain the most extensive utilization of aluminum at reasonable prices.

Actually, four agreements were completed concerning:

Raw aluminum, in the form of ingots and rolled sheets;
semifinished products of pure aluminum;
aluminum foil and aluminum paper;
semifinished aluminum alloys.

We shall not concern ourselves with the last three of these, which covered a large number of transforming plants in all countries and involved the fixing of very detailed rates for a large number of markets, but it is necessary to present a few details of the sales agreement for raw metal.

On December 24, 1936 the first agreement fixed the base price of 99 per cent ingots at £85 a metric ton and that of sheets of the same quality at £87. Higher prices were provided in the case of higher degrees of purity. On February 9, 1937 the base price was brought up to £90. An April 8, 1937 there was a further increase to £100. On September 30, 1937 the agreement was renewed on the same basis between Aluminium Français, the British Aluminium Co., Neuhausen, and the German group. The scale of prices was applied to all markets except the United States and Japan for deliveries effected before the end of June 1938. The conditions of delivery and payment were laid down according to whether European or overseas countries were involved. On July 25, 1938 the price was *reduced to* £90 a metric ton and was applied to all countries, with the exception of the British Empire, Denmark, France, Germany, Norway, Sweden, Switzerland, the United States, and Japan. On March 22, 1939 there was an increase to £95. On August 29, 1939 the agreement was limited to Neuhausen, Aluminium Français, and Norske Aluminium Company. The base price was fixed at \$455 (U.S.) a metric ton.

Co-operative organizations. Apart from the basic agreement entered into between member producers, the

Alliance Company, in the same way as the third cartel, concluded some special agreements with certain outsiders and for certain special markets. I shall summarize the most important of these agreements.

1. *Giulini contract*. The contract entered into by the third cartel with Giulini remained in force for a year. It was then replaced by a new agreement, similar to the one that preceded it, which was signed on November 10, 1932 and revised on December 19, 1932, and later by a new five-year agreement which was to remain in force from January 1, 1934 to December 31, 1938.

The Alliance Company guaranteed to Giulini a sale of a minimum of 21,000 tons of alumina a year, corresponding to a manufacturing potential of 12 per cent of the aluminum which the members of the Company were able to produce at the time of its formation. The purchase price of the alumina was 16 per cent of the current purchase price of aluminum by the Alliance Company.

Giulini, furthermore, was given the right to produce aluminum up to about 1,500 tons in the plants of Martigny and Steeg, which could be increased if the production of the members of the Alliance Company exceeded the total estimated capacity in 1931. In return for this, Giulini undertook to follow the rules of the Company.

This agreement was denounced by Giulini on November 11, 1937 and expired on December 31, 1938.

2. *Norwegian metal (Haugvik)*. By acquiring control of two Norwegian companies, the Aluminium Corporation and the International Aluminum Company, at the beginning of 1932, the Alliance Company obtained con-

trol of the Norwegian Haugvik plant, with a productive capacity of almost 10,000 tons a year.

The International Aluminum Company possessed a plant at Hepburn-on-Tyne (Great Britain), which produced about 3,000 tons of calcinated alumina a year. The Aluminium Corporation had an electrolysis and rolling plant at Dolgarrog (North Wales), producing about 1,000 tons of aluminum a year and rolling about 2,000 tons a year. The financial holding of the Alliance Company in these companies was completed by the establishment in 1933 of Alliance Aluminium Holdings Ltd., in which all the shares were held by the Alliance Aluminium Company, and which controlled in its turn the International Aluminum Company and the Aluminium Corporation.

3. *The Japanese agreement.* As we have seen above, an agreement concerning the Japanese market had been reached at Zurich on July 18, 1930, between Aluminium Ltd. on the one hand and the members of the third cartel, the Aluminium Association, on the other. This agreement, which had come into force on January 1, 1931, was originally concluded for a period of five years. It was subsequently cancelled and the quotas were changed several times. The share of the Canadian producers was raised to 58 per cent in 1937 and 60 per cent in 1938.

As had been agreed at the conference of July 18 at Zurich, Aluminium Ltd. was charged with organizing sales in the Japanese market on the whole of the quotas of the members of the Alliance Company at the prices and on the terms which seemed best. In practice, the organization was a two-fold one. On the one hand, total

sales in Japan were made through Aluminium Ltd; on the other hand, Neuhausen distributed the European quota among individual producers. The London conference of September 21, 1934 confirmed and prolonged the powers of Aluminium Ltd. with, however, the introduction of the idea of a minimum price.

The following table shows the fluctuation of prices in the Japanese market for 99 per cent aluminum ingots c.i.f. Japanese port ex customs duty:

	1931	£81. 0.10	a long ton
January-March	1932	16.32-16.5	cents a lb.
April-May	1932	16-16.32	" " "
May-August	1932	16.25	" " "
Aug. 15-Dec. 31	1932	15.50	" " "
Jan. 1-Mar. 6	1933	15.50	" " "
March 6-Apr. 20	1933	15.75	" " "
Apr. 21-May 17	1933	£98	a metric ton
May 18	1933	£100	" "
August 14	1933	£95	" "
November 27	1933	£92	" "
January 15	1934	£90	" "
March 1	1934	£92	" "
June 4	1934	£85	" "
Sept. 21	1934	London Conference, Minimum fixed at:	
		Ordinary business: £75 a metric ton	
		Cable business: £55 a metric ton	
		Actual prices—£86	
December 23	1935	£87	a metric ton
June 8	1936	£90	" " " (Increase in customs duties of £13 a metric ton, shared at the rate of £5 to the purchaser and £8 to the seller.)
December	1936	£83	ex customs duty
February 18	1937	£85	" " "
March 2	1937	£90	" " "
June	1937	£100	" " "
August 21	1937	£110	" " "
May 16	1938	£98	" " "
August 29	1938	£93	" " "
March 22	1939	£100	" " "
April 22	1939	\$440-£94	ex customs duty

The prices at which aluminum was sold in the Japanese market were somewhat below the prices in London

and Paris, in order to discourage the creation of plants in Japan. This did not mean that under the cartel system prices in Japan were lower than they would have been under international competition. It must be remembered that a primary purpose of the cartel was to prevent serious undercutting in world markets. The result was doubtless a level of prices in Japan somewhat above that which would have prevailed under a system of wholesale dumping by nonco-operating producers.

The following table indicates the total sales of cartel members to Japan and the amount furnished by the Aluminium Ltd., of Canada.

Year	Total Sales of Cartel Members	Deliveries by Aluminium Ltd.
1931	3,985	2,072
1932	5,288	2,750
1933	3,452	1,795
1934	4,077	2,120
1935	6,025	3,133
1936	8,025	4,948
1937	15,143	11,638
1938	24,466	15,235

4. *Special agreements between members of the Alliance.* As provided in the basic contract of the Alliance Company, nothing forbade "the maintenance of any existing agreement or the conclusion of any new agreement on prices between owners of 'A' shares, in a given market." Among these agreements the following may be mentioned:

The agreement between the English, French, and Canadian groups concerning Det Norske Nitridaktieselskap (Norway);

Agreement concerning production in Spain (Aluminium Français and Neuhausen);

Agreement among the Canadians, the French, and the Norwegians concerning sales in Russia.

Let us glance briefly at the chief characteristics of these agreements.

Agreement concerning Det Norske Nitridaktieselskap (England, Canada, France) established under Norwegian law on August 20, 1912. The D.N.N. possessed two plants: *Eydehavn*, situated on the Norwegian coast, 7 kilometers northeast of Arendal and 250 kilometers southwest of Oslo, with a capacity of 5,500 tons a year; *Tyssedal*, on the east coast of Sorfjord, 75 kilometers east of Bergen, with a capacity of about 17,000 tons a year.

After several changes, the D.N.N. belonged, in equal parts, to the French, English, and Canadian groups. Each third of the D.N.N. figured with its parent enterprise among the companies belonging to group 1, that is to say, those which were A shareholders. Consequently, the total production of D.N.N., divided into three parts, was strictly controlled by the rules of the Alliance Company as they were defined in the basic contract.

Spanish production (France, Switzerland). In 1925 the Aluminio Español Company was established with a capital of 1,200,000 pesos divided into 2,400 shares of three categories. Category "A", comprising 1,224 shares (51 per cent of the total), was reserved for the Aluminum Company of America. Category "B", consisting of 792 shares (33 per cent of the total), was reserved for the Alais, Froges et Camargue Company. Category "C", 384 shares (16 per cent of the total), was reserved for the Spanish group.

After several changes, including sale by Alcoa of its shares, the capital of the company is today divided into

two thirds for Aluminium Français and one third for Neuhausen. Aluminio Español, as we have seen, was among the producers in group 3 who could become shareholders in the Alliance Company. But the operation did not take place.

In view of the absolute control over it exercised by the two members, however, Aluminio Español cannot properly be considered as an outsider. Moreover, with a capacity of about 1,500 tons, which was insufficient to meet national needs, its production did not raise any problem which necessitated special agreements.

Sales in Russia (France, Canada, Norway). On May 15, 1935, an agreement was arrived at between Aluminium Français, the Norsk Aluminium Company, and Aluminium Ltd. which provided that the signatories should share all the orders from the Soviet Union covering raw aluminum, semifinished products, and alumina. The orders were to be shared, in principle, among the signatories according to the following quotas:

	Raw aluminum	Semifinished Products (Per cent)	Alumina
Norsk Aluminium Co.	50	50	30
Aluminium Français	30	20	50
Aluminium Ltd.	20	30	20

The agreement remained valid for a period of one year and was to remain in force until renounced by one party by giving four months' notice to the two others. It was never renounced.

The table on page 58 gives the actual totals of sales in Russia before and during the period of operation of the Franco-Canadian Agreement.

5. *Geographical distribution of stocks.* As we have already seen, one of the essential aims of the Alliance

SHARES OF THE CONTRACTING MEMBERS ON
THE RUSSIAN MARKET

Date	Total Tonnage of the Contracts (Long tons)	Shares of				
		French	Canadian	Norwegian	British	Miscellaneous
1927.....	7,400	6,400	1,000			
1928.....	4,000	2,905	1,095			
1929.....	6,000	4,000	2,000			
1930.....	5,500	3,750	1,750			
1931.....	17,580	6,107	—	4,600	1,533	V.A.W. 1,705
1932.....	17,000	2,050	1,850	4,700	—	Neuhausen 1,335 Al. Corp. 2,300 V.A.W. 3,100 Neuhausen 2,300 Al. Corp. 1,600 A.A.C. 1,400
1933.....	5,000	667	667	2,000	667	Al. Corp. 1,000
1934.....	4,900	4,900	—	—	—	
1935.....	2,000	508	405	1,120	—	
1936.....	500	135	107	297	—	
1937.....	1,250	310	250	690	—	
1938.....	9,700	2,910	1,940	4,850	—	

Company was to be able to make rapid deliveries at the time desired and the place indicated by the consumer. On the other hand, before the existence of the Company, it frequently happened that metal was carried from one country to another while similar metal made the same journey in a reverse direction. This situation led to supplementary expenses for transportation, customs, duties, etc.

From the time of the establishment of the Alliance Company, all movements of metal connected with purchases and sales of stocks by the Company were greatly simplified by the introduction of "delivery orders", which were a kind of endorsable bill to order drawn by the Alliance Aluminium Company on the first seller, and each valid for 100 tons of 99 per cent aluminum ingots deliverable c.i.f. Antwerp.

CHAPTER VI

BENEFITS TO THE CO-OPERATING COMPANIES

From the point of view of the co-operating producing companies, the aluminum cartels had three primary objectives: (1) to minimize the business risks involved; (2) to promote efficiency in operation; and (3) to extend the markets for aluminum products. It is the purpose of the present chapter to reveal the methods by which these objectives were realized and to indicate the results obtained.

I. INSURANCE AGAINST RISKS

An outstanding characteristic of the aluminum industry is the very large fixed capital investment required in relation to the volume of business. In large-scale industrial enterprises annual sales are commonly three or four times the amount of the capital investment, while in commercial lines the proportion may run as high as ten times or more. In the aluminum industry—including bauxite mines and hydroelectric establishments—the proportion of sales to investment falls as low as two to one or even one to one. Fixed charges include not only outlays on account of capital investment, but also a substantial part of the cost of research and laboratory experiments, which cannot economically be reduced in periods of depression.

Some years ago I made a study of the costs of the prewar American aluminum plants, which were in a favorable position because they had been constructed in a period when costs were relatively low. My conclusion was that fixed charges in these plants represented 25 per cent of total costs when operating at full capacity and 40 per cent if operated at half capacity. Today, despite lower rates of interest, fixed charges on new plants are very much higher. In Europe under present economic and financial conditions, the proportion would be still higher.

As a result, the aluminum industry is more than ordinarily vulnerable to the effects of economic crises. Aluminum producers have therefore sought in every way to minimize the risks involved and to mitigate the effects of depression.

Price control. The most important means of ensuring against risks was by reducing price fluctuations. The procedure related both to *daily and weekly fluctuations* and to *longer term cyclical changes*.

Short-term stabilization suppressed current fluctuations resulting from temporary shifts in relation to supply and demand, from speculative activities, and from political and military uncertainties. Comparatively fixed prices were applied over a period of several years. Since the effects of such stabilization were of more significance to consumers than to producers further discussion is reserved to the following chapter.

From the producer's point of view, the really important price regulation policy related to the business cycle. The policy adopted was in striking contrast to

that followed by most business enterprises, competitive as well as monopolistic. In ordinary competitive enterprises business managers had all too frequently allowed prices to rise in periods of business prosperity to the full extent made possible by existing conditions. In consequence, productive capacity has usually greatly expanded, either by existing companies or by new companies lured by the high level of prevailing prices and profits. As a result, in a depression, the glut in the markets has led to a catastrophic decline in prices.

In contrast, the aluminum cartel followed a policy of actually lowering prices in periods of prosperity, with the result that the increase in productive capacity was restrained. Consequently, in time of depression, the accumulated stocks were much smaller than they might otherwise have been, thus preventing a complete collapse of prices.

In further elaboration of this point, it may be stated that, whereas in most lines of industry whether monopolistic or competitive, the practice has been to make as large profits as possible in periods of prosperity in order to build up financial reserves with which to tide over periods of depression, the aluminum cartels sought in boom periods to restrain undue expansion by means of low-price policy, thereby minimizing the shock of the depression. It is the author's belief that such a policy, if universally followed, would materially reduce the fluctuations of the so-called business cycle.

It may well be asked whether this policy did not adversely affect employment. In my judgment it did not. In the first place, there is little in industrial history to support the view that the continuous reductions in prices

during a period of depression permits quicker recovery; not until prices have been comparatively stable for some little time do the fears of businessmen subside and confidence return. Moreover, in the case of aluminum there is little chance in any *short-run* period that sharp reductions in price would appreciably affect demand. This is because the metal is ordinarily used along with other products and commonly constitutes but a small fraction of the total cost of the finished article. For example, there are only about 15 pounds of aluminum in the ordinary automobile. Even in the airplane industry aluminum constitutes but a small fraction of the cost. The Joint Army and Navy Munitions Board has pointed out that reduction of from 15 to 10 cents a pound in the price of aluminum would permit only a 1 to 2 per cent reduction in the price of a finished plane. While in the long-run, reductions in the price of aluminum permit progressive expansion of the market, in the short run, the reductions would have little if any stimulation upon the demand and, consequently, upon employment. It is my belief that the price policy pursued expanded employment in the aluminum industry without reducing it elsewhere.

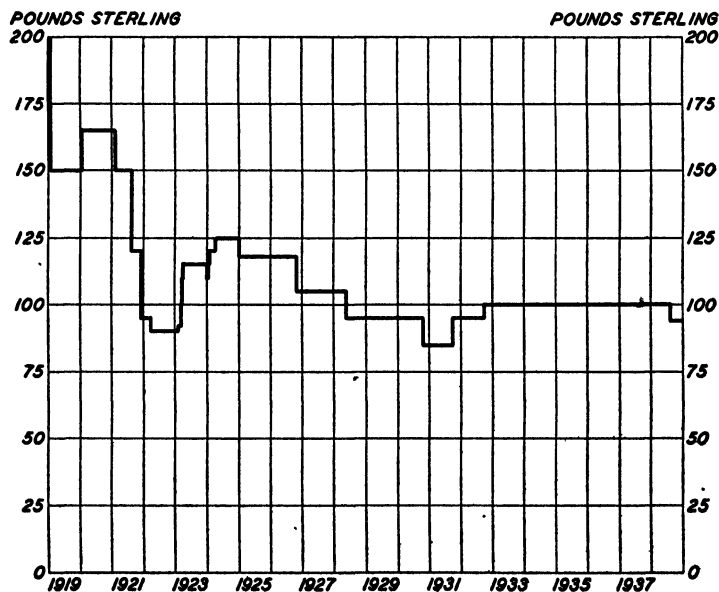
The results of this stabilization policy can be indicated only by means of price quotations. We present on pages 64 and 66-67 charts showing the price fluctuations in both the London and the Paris markets. The reader will bear in mind that the relative prices in these two markets were distorted from time to time by currency devaluations. The figures for each market nevertheless showed the degree of stabilization achieved.

The official London prices of aluminum ingots from

1919 to 1938 of the British Aluminium Company are shown in the graph below.

There are two observations to be made on this chart. In the first place, during the years 1922 and 1923, the

OFFICIAL LONDON PRICE OF ALUMINUM INGOTS, 1919-38^a
(In pounds sterling per long ton)



^a For data see App., p. 123.

quotations of the British Aluminium Company were very low; but the statistics show £120 to £125 a ton for the year 1922 and £110 for 1923. From this it may be concluded that during these two years the market was very unstable, and the official prices were not generally applied.

In the second place, there occurred in 1932 a devaluation of sterling which brought about a rise of £5 only in the price of the metal—at a time when a rise of £25 or £30 would have been in accordance with the depreciation of the currency.¹ It must be noted, further, that from this date the price paid by the customers was reduced by 2 per cent for cash payment.

If the liquidation years which followed World War I and the rise which took place at the beginning of World War II are excluded, the striking facts are: (1) there was no change in prices for periods of 3, 4, and 6 years; (2) there was a very slight variation in prices at the time of the peak of the boom and the lowest point of the depression in the economic cycle.

Let us now examine the trend of aluminum ingot prices in the French market. In this case we are able to give the data for the entire period 1900 to 1939.

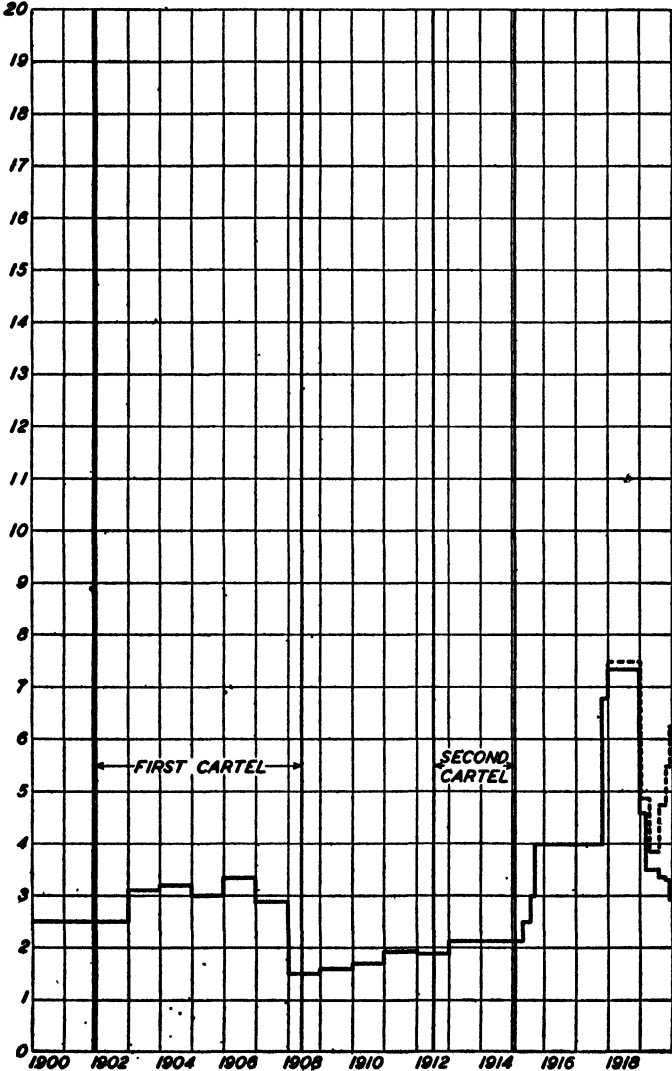
The price curve in paper francs presents an erratic appearance, due to violent currency fluctuations and to the high prices which it was necessary to pay to import the requisite foreign metal in World War I. On the other hand, prices calculated in gold francs present, except for the war period, a stability quite comparable to that of English prices. This is particularly true of the period 1926 to 1939.

The relative stability of prices in the aluminum industry as a result of the cartel organization can be seen from the chart on page 68, which shows the relative price fluctuations on the London market for lead, copper, zinc, tin, and aluminum. It will be noted that from 1926

¹ Major Cooper, Chairman of the Board of the British Aluminium Co. fought strongly for the very small increase of £5 which was agreed to by all the members of the cartel.

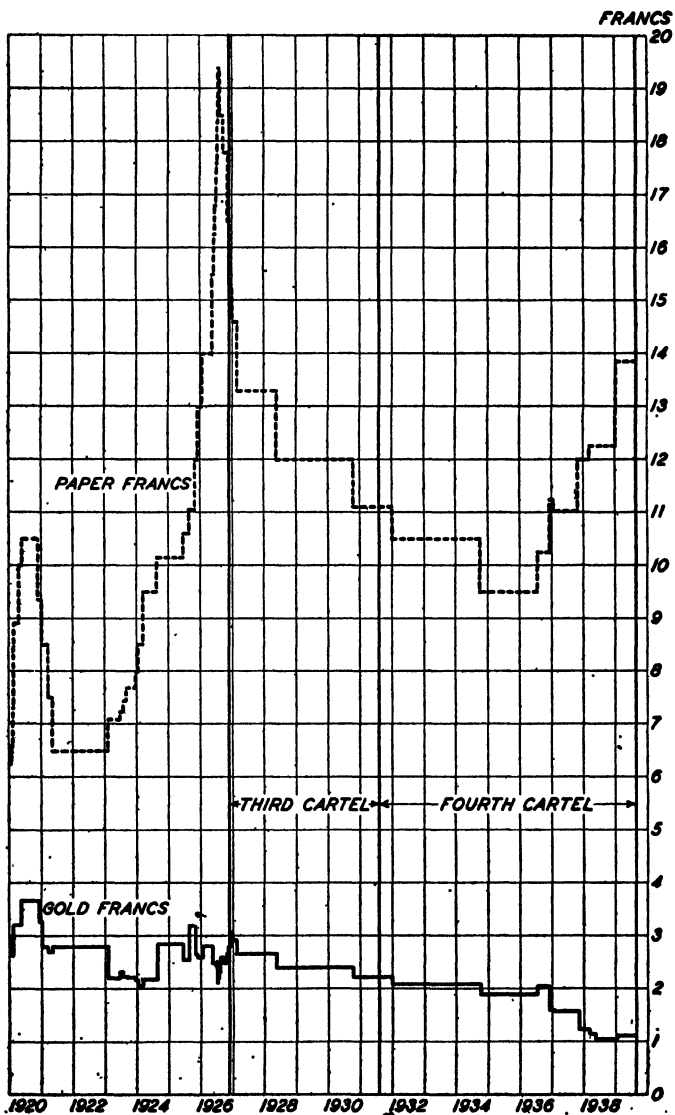
MOVEMENT OF ALUMINUM (In gold and

FRANCS
20



* The figures are the official prices of aluminum ingots. For data

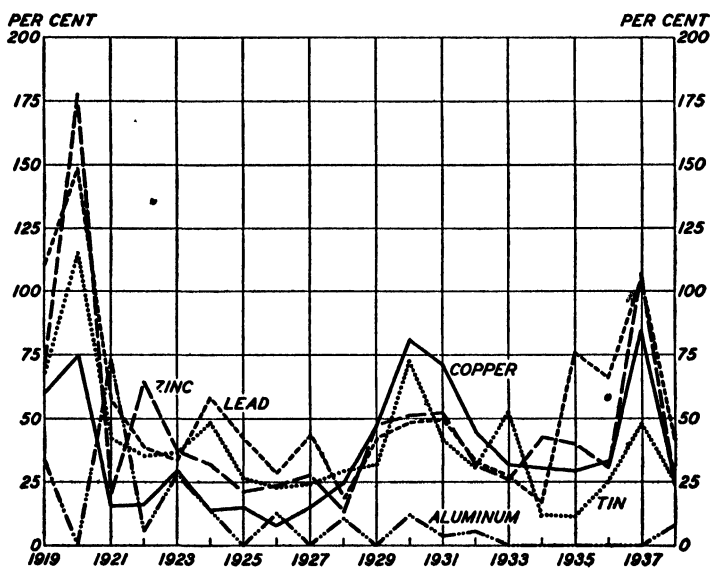
PRICES IN FRANCE, 1900-39^a in paper francs)



to 1938 the *yearly* variation is almost nil, while for the other metals it is often very wide.

Control of stocks. One of the gravest problems with which aluminum producers were confronted was the ac-

YEARLY PRICE RANGES OF SPECIFIED METALS ON THE LONDON MARKET, 1919-38^a



^a The annual differences between maximum and minimum prices are shown as percentages of minimum prices. For data, see App., p. 126.

cumulation of excess stocks, especially in periods of depression. Control of stocks of metal thus appeared as one of the most important means of minimizing the risks of operation.

Aluminum is still a high-value metal, as is perhaps best indicated by the fact that it is sold by the kilogram

or the pound and not by the ton. Accumulation of stocks corresponding to six or eight months' consumption might be sufficient in some cases to bring about actual bankruptcy. There is a tendency to continue production in periods of slack demand because of the enormous losses accruing when large capital investments are unused. In this industry, therefore, accumulation of large stocks is a frequent and dangerous occurrence. It has already been shown that at the time of the establishment of the fourth cartel in 1931, accumulated stocks represented sixteen months of consumption at that time.

There are two methods of relieving companies suffering from excessive stocks. If the difficulty is of minor proportions, the cartel may purchase some of the accumulated stocks. In the case of a prolonged general depression, however, this is not sufficient because it does not change the world market situation. Accordingly, a second method was applied consisting of a severe restriction of production during the depression period. Following 1931, manufacturing rights were reduced on the average to 55 per cent of the existing productive capacity. During the first two years stocks ceased to increase; and in the next two years the pickup in consumption was sufficient gradually to eliminate the accumulated supplies.

Other insurance devices. The strongest means of minimizing losses for co-operating companies was through the operation of the quota system. Crises do not develop in all countries simultaneously; hence a given country which supplies the bulk of its own domestic market and some of the international market may find

that in a given year its aggregate production has been, as a result of depression, less than the quota assigned. Accordingly, in such a case those whose production and sales had exceeded their quota had to buy enough from the depressed country to restore the normal equity.

Finally, the cartel was able in time of crisis to mitigate the financial difficulties of the harder-pressed companies. This was accomplished by means of bank borrowing by the cartel on the security of its own assets, consisting of cash and stocks of metal. With the proceeds of these loans the cartel purchased accumulated stocks of companies which were in greatest distress.

II. PROMOTION OF OPERATING EFFICIENCY

Efficiency in production and marketing was stimulated in a variety of ways, which may be briefly summarized:

(1) The cartel made possible a standardization of production both in quality and size, thus simplifying manufacturing processes and reducing costs. As late as 1925 aluminum was sold in three different grades: 98-99 per cent quality, 99 per cent guaranteed, and 99.5 per cent. After the creation of the Alliance Company in 1931, the 98-99 per cent grade was eliminated. The basis of sales became foundry ingots of a minimum grade of 99 per cent, and deliveries made to customers ordinarily exceeded 99.2 per cent. Similarly, the terms of sale were standardized. Prices for small deliveries were the same as for large deliveries.

(2) The stocks of metal that had to be carried by producers were reduced to meet current demands. Instead of building up supplies in anticipation of a possible

expansion of sales, the stocks of each producer were regulated by the quota arrangements. When the production of each member was limited by quota, if, for a short period, the orders of a given company exceeded the extent of the manufacturing quota, the added tonnage could be easily obtained from producers whose demand was temporarily slack. Moreover, the cartel itself could provide the deficiency out of its own "regulating" stocks.

In a word, under the aluminum cartel system the reserve stocks which it is prudent to maintain are governed not by the requirements and expectations of individual companies but by the over-all market situation. Under a system of full competition, the calculation of the margin of requirements involves, for each producer, a judgment of data of which he has only an *imperfect* knowledge. His knowledge is much less complete than that of all the producers assembled together around the table. Moreover, if he is isolated, he is almost completely ignorant of the exact figures of stocks and production capacity, either in existence or in the course of being erected, owned by his competitors. If he belonged to the cartel, these data were known to him exactly, either because it was compulsory to declare them (in the case of stocks and existing capacity), or because they could not in practice be concealed (in the case of developments under way) by associates who were in constant contact with one another.

(3) The building of manufacturing and hydroelectric plants beyond potential requirements was restrained. This was accomplished in part by discouraging, through the medium of low-price policies, new companies from

entering the field, and in part by the quota system which was based upon reasonably accurate knowledge of overall requirements, both in the immediate present and over a period of some years.

The economies here involved were very large. In Europe at least two years are required to equip a large aluminum plant and four to five years to build a large hydroelectric plant. Accordingly, even though depression may not come for several years, the construction of plants beyond requirements will entail large losses. The risks are great enough, even when the expansion is more precisely adjusted to the ascertainable trend of demand.

(4) Plants were operated on a more stable basis. In periods of rising demand for the product of a given company, a producer, instead of putting into operation a plant which had been idle, could purchase the required metal from the cartel or other members. Consequently, every plant tended to be operated at relatively full capacity.

In short, in periods of rising demand hitherto idle plants were not opened until the demand was sufficient to absorb pretty much the full output; similarly, in a falling market certain plants were closed down completely. Thus there was a tendency for each plant in use to be operated at reasonably full capacity. Naturally, the units maintained in operation were the lowest-cost producers.

(5) Transportation costs were reduced by economizing the distance which stocks travel. Since the stocks of the cartel were widely distributed, it was possible under

the system of "delivery orders" to deliver metal from the nearest stockpile or plant to the consuming industry. Agreements were also frequently made between producers for the delivery of bauxite, alumina, and petroleum coke from the point nearest to the consuming center.

(6) In some cases commercial expenses have been reduced by means of a common sales organization for a given market area. This was notably the case for the Japanese and Russian markets.

(7) The collective organization made possible extensive and continuous publicity. The publicity program was better co-ordinated and less conflicting in character, and less confusing to the consumers of the product.

(8) In the technical sphere and in the development of new uses for aluminum the collective system possessed an important operating advantage. With unrestricted competition, the risks involved in developing new uses are considerable. When undertaken by a single company that company alone will bear the cost if the experiment fails. If it succeeds each producer will compete for the new outlet resulting from personal effort alone. In a cartelized industry, however, the expenses for finding new outlets are shared among all the members, and through the operation of the quota system the same is true of profits.

III. THE EXTENSION OF MARKETS

One of the primary purposes of the evolving aluminum cartel system was to foster the basic research essential to the widening and expansion of markets for alumi-

num products. With this end in view, the British Aluminium Company proposed in 1927 the establishment of a joint information and development organization. At a meeting of the Committee of the Association held at Basle on February 10, Aluminium Français was asked to submit a plan to the Committee, and this plan was formally approved on May 4, 1927. The International Research and Development Office was located in Paris and was entrusted with the task of enlisting the cooperation of consumers of aluminum products, coordinating research programs, and making special studies at the joint expense of all members.

It may be of interest to give some details of the structure and procedure of this bureau. Four sections were provided for:

1. *General information.* The object of this section was to gather all information relating to the production and sale of aluminum. This included patents; statistics of production of raw materials; discoveries of or beginning the exploitation of new deposits; statistics of production of oil refining plants (for production of petroleum coke); establishment of new plants; development of hydroelectric plants for aluminum production; special legislation in different countries concerning the exploitation of bauxite deposits; hydroelectric power and aluminum plants; statistics of production and consumption of aluminum; and data on customs duties.

2. *Research into new uses.* This section was designed to collect all information concerning new uses, so that they might be brought to the attention of producers, with an indication of means for encouraging their development. The studies and experiments relative to new uses and applications for aluminum were to be carried

on by one or several members in agreement with the committee.

3. *Standardization of commercial alloys.* It was important for the convenience of the public to fix standards for alloys which, in view of their number, their varied names, and their sometimes similar compositions did not give the consumer a very clear idea of their nature and were liable to cause serious confusion.

4. *Publicity.* The bureau was charged with finding the best means for encouraging the use of aluminum (pamphlets, films, newspaper advertising, etc.). Each producer kept his independence within his own sphere, but he was always required to send to the bureau advance copies of texts which he proposed to publish.

The publicity methods employed were as follows:

Direct advertising to develop the use of aluminum;

Publication of pamphlets on light alloys, their usage, and their working;

Editing of documentary articles for newspapers and periodicals;

Lectures and participation in conventions;

Exhibitions;

Competitions to obtain the collaboration of the public in seeking new uses for aluminum.

The International Development Office was able to carry out a comprehensive long-term research program which no single company could have afforded to undertake. Moreover, the bureau was able to overcome settled habits and inertia within the industry.

It has often been said that cartels are destructive of technical progress and that producers, protected against competition, become slack and adopt something of the

attitude of bureaucrats, losing the desire for research and invention—thus losing the stimulus for initiative and progress. This criticism certainly does not apply to the aluminum cartels.

In a cartel agreement limited to a period of a few years the force of competition is not destroyed; it is only regulated for a particular period of time. All members of the cartel are, or can be, future competitors. They must take account of the fact that, if the cartel is renewed, new quotas will be allotted, and these quotas will be granted to members according to their capacity and taking account of their costs and the extent of their technical progress.

The limited duration of the agreements and the possibility of renouncing them have been healthy for the aluminum industry as a whole, and have promoted its long-term prosperity. The members collaborated effectively for the duration of each cartel in order to obtain the best results from the agreement. This collaboration was exercised in all spheres. But at the same time each company knew that on termination of the agreement, or in case of its renunciation, the normal rules of competition would once more prevail in full force.

When a new cartel agreement was formed, the quota assigned to each producer was fixed, not according to former figures of sales or past technical reputation, but according to the actual position which the number and steadiness of his customers assured him, plant capacity, completeness of equipment and, above all, relative costs of production. At the risk of losing his place in the world

aluminum industry, every producer therefore retained strong interest in ceaselessly improving his manufacturing processes. Even though it operated only once in two or five years, competition periodically made its influence felt as surely as when it operated more or less continuously. It is here that one finds the essential difference between the cartel form of organization and the unified monopoly.

It is therefore quite inexact to think that the member producers slumbered in an artificial security and that they did not pay all the attention to technical progress that it deserved. The contrary was the case. Experience proved that the best situated, the best equipped, and the most progressive companies obtained the rewards of superior efficiency. Cartelization, as it was understood for nearly forty years in the aluminum industry, did not lead to stagnation but to progress.

Associated in all activities which could bring about a development of the world market, the creating of new uses, the standardization of products, and the suppression of duplication, producers remained interested in ensuring themselves, by the quality of their manufacture and through the lowering of their costs, an increasing part in a market which was developed thanks to collective efforts. This fact is illustrated by the table on page 78, which indicates the quota of the different producers in the successive cartels.

It can be seen from these figures that the development of the groups who were the most progressive or the best situated from the economic point of view was not

obstructed by the cartel system. It is to be noted that the oldest of the European producers, Neuhausen, had its share reduced by two thirds, while the share of the Canadian group, which benefited by low power costs and powerful mechanical installations, developed considerably. The exceptionally high quota given to the

SHARES OF EACH MEMBER IN THE SUCCESSIVE CARTELS^a
(In per cent)

Member	Nov. 2, 1901 1st Cartel	June 10, 1912 2nd Cartel	Sept. 11, 1926 3rd Cartel	Oct. 21, 1931 4th Cartel
French Group.....	17.7	38.9	33.1	21.36
Swiss Group.....	48.4	21.4	23.8	15.43
Canadian Group.....	21.0	16.0	—	28.57
British Group.....	12.9	19.9 ^b	16.0	15.00
German Group.....	—	—	27.1	19.64

^a Note, furthermore, Soci ta Italiana 1.9 per cent, Aluminum Corporation 1.9 per cent.

^b British Aluminium Co. 16 per cent and Anglo-Norwegian 3.9 per cent.

French group in 1912 in the second cartel is explained by the general conviction that this group possessed a new technical process which represented a very great step forward. When it was seen to be impossible to perfect this process on an industrial scale, the same group had later to accept a considerable reduction in its quota.

It is thus apparent that the cartel system as applied in the aluminum industry systematically promoted technical progress in the industry. The advantages gained by the low-cost producers exerted continuous pressure for the improvement of productive processes.

IV. INCREASE IN CONSUMPTION

World consumption of aluminum increased continuously. In 1921 it was 71,200 tons, while it is estimated

that the total consumed in 1939 was 658,000 tons. This represented a coefficient of increase of 9.66. Presented thus in isolation, this figure although remarkable does not reveal its full significance, and it may be said that 1921 was a year which was too abnormal to be chosen as a basis of comparison. But if the figures of the increase which took place from 1921 to 1938 (the last year for which there are definitive figures) are compared with the other important nonferrous metals, the development of aluminum is evident.

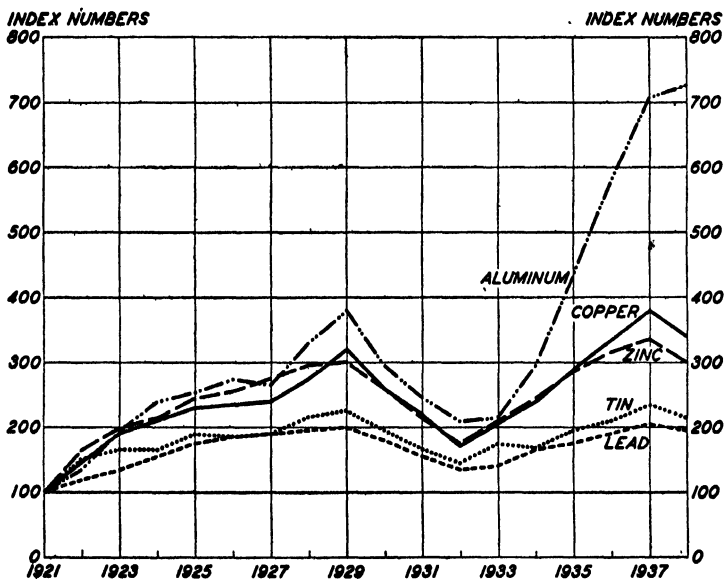
The chart on page 80 shows the relative increase in consumption for the years 1921-38 of the principal non-ferrous metals.

It goes without saying that the extraordinary development in the consumption of aluminum was due in the first place to the qualities of the metal, and to the fact that aluminum was still a new metal. It is also attributable in substantial degree to the continuous efforts through collective organization, involving technical research into the best alloys, better manufacturing and marketing processes, methodical and enterprising investigation of new uses, and systematic advertising. Finally, the expansion of markets was in no small measure the result of the policy adopted by the later cartels of progressively reducing prices as technical developments made such reductions possible. This policy will be discussed in the ensuing chapter.

In the last analysis the purpose of the aluminum cartel was to stabilize and expand the profits of the co-operating members. Unfortunately it is not possible for me to indicate the precise effects of this policy upon profits,

inasmuch as the profits were made by producing companies in various countries, some of which have never made public the details of their financial operations. It is thus impossible to present any conclusions ap-

WORLD CONSUMPTION OF THE PRINCIPAL NONFERROUS
METALS, 1921-38^a
(1921 = 100)



^a For data see App., p. 127.

plicable to the members of the cartel as a whole. The problem is complicated by the fact that some of the companies were not only producers of aluminum, but of other products as well, and the operations were intermingled. Such, for example, was the case of the two

French aluminum producers which turned out not only aluminum but also a wide range of chemical products.

I would, however, conclude that the profits made by the aluminum producers during the period 1926-39 were on the whole satisfactory. Certainly the financial position of all the producing companies was good at the end of the period.

CHAPTER VII

EFFECTS UPON CONSUMING INDUSTRIES

The cartel agreements were instituted for the benefit of the producing companies, and, as we have seen, the objectives were on the whole reasonably well achieved. It remains to inquire whether the advantages to the producers were obtained at the expense of the consumers of aluminum products.

The effects upon consumers are manifest chiefly through the medium of prices. The consumer's interest was of a two-fold character, relating respectively to the stability and to the general trend of prices.

I. STABILIZATION POLICY

Comparative stability of prices is of considerable advantage to the industries consuming aluminum products. When a finishing industry utilizes a speculative raw material, the fact that the price can change considerably from day to day compels it to seek protection against this risk. It must, therefore, accumulate very large stocks in its factories or pay large premiums in order to buy in advance raw material which it may not utilize for several months. When prices are stable, a reduction of 50 or even 75 per cent in the stocks of metal is possible. With the cartel, manufacturers of finished products can limit the stocks of metal in their factories to their manufacturing needs for about six weeks or two months.

The comparative stability of aluminum prices is often a decisive factor in its favor. In studying the relative

advantages of aluminum and other materials such as copper, zinc, and plastics, large-scale manufacturing companies attach considerable importance to price stability, because it makes possible a much better control over costs. Where the amount of aluminum used is small in relation to the whole manufactured product, this consideration is of only secondary importance. But where the amount of aluminum used is large, it is a major consideration.

II. THE TREND OF ALUMINUM PRICES

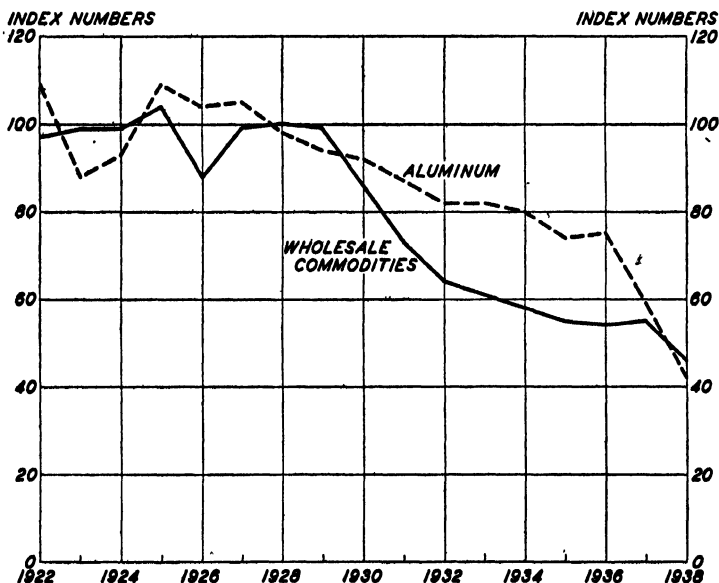
We come now to the most important issue pertaining to cartel policy, namely, the effects upon the level of prices for aluminum products over a period of years. Was the policy one of maintaining or raising prices, or was it one of progressive reduction?

The trend of aluminum prices in the French market from 1900 to 1939 is shown in the diagram on pages 66-67. Since France was operating on a paper money basis after 1918, the postwar figures are given in terms of both gold and paper. The trend would be much the same if the quotations were drawn from the English market.

Prior to World War I, the chart indicates no definite trend. During the period of the first cartel, a high price policy was pursued for a time. The collapse of 1907-08 was followed by a gradual advance, but the level of 1913 was appreciably below that of 1900. In the early postwar years, prices fluctuated considerably; but after 1926, when the third cartel was established, the trend was steadily downward.

The question will be raised whether this decline does not merely reflect a general decline in prices over the period under review. How did the trend of aluminum prices compare with that of wholesale prices in general?

COMPARATIVE MOVEMENT OF WHOLESALE COMMODITY AND
ALUMINUM PRICES IN FRANCE, 1922-38^a
(In terms of gold francs. 1922-25 = 100.)



^a This chart ends in 1938, the last full year before the dissolution of the cartel in September 1939. For data see App., p. 128.

The diagram on this page shows the trend of aluminum and wholesale commodity prices in France for the period 1922 to 1938. We have confined the comparison to this period for two reasons: first, because of the wide

fluctuations of the war and early postwar years; and, second, because it might be said that the aluminum industry had not reached a stage of comparative maturity until after the first World War. In the diagram, we have used as a base the four years 1922-25 inclusive, when the industry was operating on a competitive basis. The period 1926-38 was that in which the author was chairman of the international aluminum cartels.

It will be seen that the trend of aluminum prices during this period was not essentially different from that of wholesale prices in general. The over-all decline from the base period to 1938 was 54 per cent for the wholesale index of all commodities, and 58 per cent for aluminum.

The chart also shows the effects of the policy of the aluminum cartel in connection with the cycle movement of the late twenties and early thirties. It will be seen that prices declined rather markedly in the peak years of the prosperity period after 1927. It also shows that the decline was less sharp in the early thirties, in accordance with the stabilization policy.

Attention must now be called to the exceptional decline which occurred after 1936. Since the new cartel policy removing restrictions on production was adopted in February 1936, it might seem off hand that the decline in prices was due simply to the removal of production controls. It was, however, primarily due to a combination of other factors. In the first place, the cumulative effect of technological advances made itself felt strongly at this particular time. The reader should bear in mind that since the discovery of the electrolytic process in the

late 1880's no revolutionary development had taken place in the production of aluminum. The efforts of the producers were directed rather to minor improvements in the many phases of the producing and manufacturing process. They included utilization of lower-grade bauxite, fabrication of electrodes from improved carbon, more efficient electrical engines, and the use of larger electrolytic pots. Such technological progress was especially rapid both in the United States and Europe during the long depression period.

These improvements resulted in a reduction in the consumption of electric power per unit of aluminum by more than 40 per cent. A similar reduction took place in the amount of petroleum coke consumption.

Second, the cost per unit of electric power declined rapidly in some areas during the early thirties. This was especially the case in Canada where a vast quantity of cheap power was developed on the Saguenay River. It was this development more than any other thing which permitted the reduction in costs in Canada and, it will be recalled, placed the Aluminium, Ltd. of Canada, in a strategic position in the cartel. It was to the interest of the Canadian producers to reduce their selling prices in order to expand their markets. The other producers were forced to adhere to the new collective agreement because the alternative—a disruption of the cartel—would have been worse. The best policy was to accept the logic of the situation and make renewed efforts toward reducing their own costs of production.

Third, the aluminum industry at the particular period was benefited greatly by the increase in consumption

resulting from economic recovery and the developing war program. As we have seen, because of the high ratio of fixed charges to total cost, it is easy for this industry to reduce prices in a period of rapidly expanding business.

There is abundant testimony that consumers were reasonably satisfied with the price policy of the cartel. In 1937 the International Chamber of Commerce undertook an inquiry among producers and consumers with a view to studying the advantages or drawbacks of international cartels from the point of view of international commerce. The representatives of the largest groups of consumers of aluminum—rolling mills, foundries, cable manufacturers, manufacturers of kitchen utensils—were asked to give their opinions, for transmittal to the International Chamber of Commerce, concerning the policy followed by the aluminum cartels. All replies received were favorable. I shall quote three in particular, which represent *more than two thirds* of total aluminum consumption in France.

On February 17, 1937, Mr. Debieve, president of the Sheet Rolling Union and of the Association of Producers of Aluminium Foil, wrote:

I am able to state that the policy pursued by Aluminium Français, member of the Alliance Aluminium Company, has been, more especially during later years, a broad-minded one for which its customers, speaking generally, can only have praise. The two most interesting characteristics of this policy have been as follows:

Stability of prices, which has allowed consuming industries to reduce to a minimum their reserves of raw materials and to establish their long-term programs with confidence.

Fruitful activities so far as concerns the development of the uses of light metals and alloys.

From this point of view, aluminum producers seem to me to have made a considerable effort which, though it is in the first place useful to themselves, none the less is advantageous also to their industrial clientele, which thus obtains, through the efforts of the producer, an increase in its own activity.

Altogether, both from the point of view of the French market and from the international point of view, I am convinced that soundly based arrangements between producers, as in the case of the Alliance Aluminium Company, can only be to the advantage of all the industries which are supplied by those producers.

On March 19, 1937, Mr. Vesier, president of the Union of Copper and Aluminium Cable Makers, summing up his opinion on the policy of the cartel, wrote:

Its policy of moderate prices, the efforts which it has made to encourage the use of this metal, which has been so particularly developed in France, and to resolve the technical difficulties encountered, are appreciated by all our members. Supplies are assured in a regular fashion, French producers having taken all the necessary measures to guarantee every time to their customers the delivery of the quantities of metal needed by each. In a general manner, it seems to me that the operation of the Alliance Aluminium Company, so far as it is possible for me to judge its relation with Aluminium Français, has had nothing but fortunate repercussions on our industry.

On February 8, 1937, Mr. Reinold, president of the Manufactured Articles Syndicate, wrote:

Although it is always to be feared that a producers' cartel will use the monopoly which it possesses to ensure unjustified profits at the expense of its customers, Aluminium Français has on the contrary, pursued a policy of extremely moderate and stable prices. In particular, changes in prices are very rare

and allow each industry to draw up long-term programs without the constant fear of differences in the prices of the raw material. In my opinion, this is a factor of the highest importance. Furthermore, I should like to mention the sustained efforts made by Aluminium Français, in the field of development, efforts which have been crowned with success in our branch, since, although the use of aluminum in household articles is one of its oldest applications, the sale of these articles increases regularly, which well demonstrates the effectiveness of the policy followed.

The only consumer criticism of cartel price policy relates to the so-called *differentiation of prices*. As the aluminum cartel enjoyed for the limited duration of its existence a semimonopoly and did not have to reckon with an independent wholesale market, it was in a position to adopt a measure of price discrimination in its price fixing. It could apply different prices to different types of consumers.

If this policy had been followed generally, it could not have failed to raise strong objections. It is a general rule of commercial enterprises not to grant favors to one group of customers. This rule should be still more strictly applied if a favor given to one consumer is to be translated into an additional price paid by another consumer. The different cartels sought to avoid arousing criticism on this score. They held, however, that rebates could be authorized by the cartels for certain *special* purposes, when it was a question of developing certain new uses. This was the case when aluminum came to take its place alongside copper in the production of high tension cables. A basic reduction of £5 or £10 a ton was allowed to cable manufacturers. In the same way, in

order to try to develop the use of aluminum in automobile manufacture in France and in Germany, special reductions were authorized. These reductions were in reality designed to induce customers to abandon former practices and to make experiments which involved some risk. Producers of aluminum thus bore a share of the risk.

It is evident that such reductions ought not to assume a *permanent* character. It must furthermore be recognized that it was possible, in the case of aluminum, to grant rebates of the order of 10 or even 15 per cent in exceptional cases, without necessitating the payment of a supplementary price by other consumers. I have noted several times that in the aluminum industry fixed charges account for 25 to 40 per cent of the total costs. As long as the reduction did not reach this figure, every new use brought a supplementary profit to the producer, who thus was able to reduce the price paid by other consumers.¹

III. THE EXPLANATION OF LOW-PRICE POLICY

Contrary to a widespread impression it was to the long-run interest of producers to reduce prices progressively rather than to maintain or increase them. There are two primary reasons for this seeming anomaly.

First, if the cartel establishes unduly high prices, leaving too high a margin of profit, additional competition from outside firms is encouraged. The resulting

¹ It is worthy of mention here that cartels tended to reduce the practice of dumping excess stocks in the free markets of nonproducing countries.

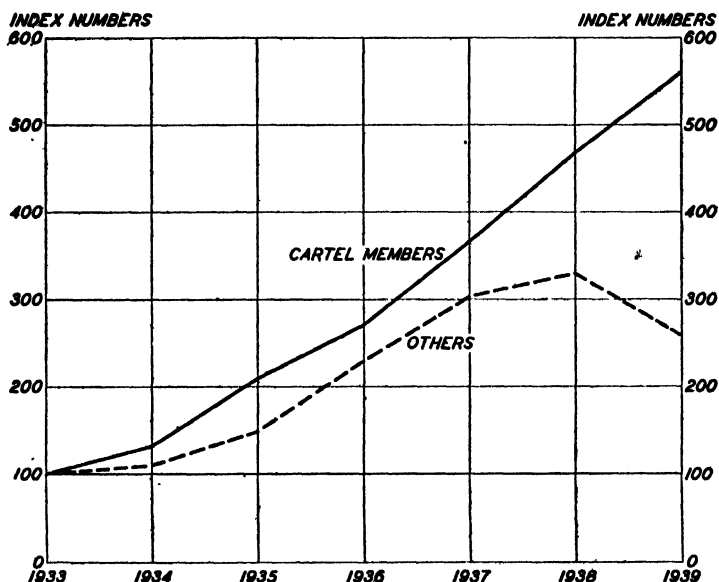
overproduction in due course results in a collapse of prices. This phenomenon is of course not peculiar to aluminum.

Such a development is well illustrated by the experience of the first aluminum cartel. After having remained fixed for several years at 2.75 francs, which was reasonable, the price was increased to 3.50 francs and even for a time in 1907 to 4 francs. In a few months new producers appeared—in France, in Italy, in Norway, in England, and in Switzerland. In spite of the demand for lower prices made by the Swiss and French groups, no action was taken until October 1907, when the price was reduced to 2 francs. The reduction came too late. In accordance with the proposal of the French group, the cartel was dissolved in April 1908 and the aluminum producers, old and new, had to go through a crisis arising from unlimited competition which reduced the price of the metal definitely below costs, to about 1.50 francs and even below. For three years, all producers suffered considerable losses.

The policy of the cartels which were subsequently created in the aluminum industry was quite different. The producers, learning from experience, tried to obtain the confidence of their customers by avoiding the raising of prices above a reasonable level and sought, on the contrary, to give consumers, as well as themselves, the benefit of the lower costs which technical progress enabled them to realize. This policy, followed without interruption from the time of the re-establishment of the cartels after the first World War, produced satisfying results. The cartel established in 1926 and reorganized

several times was interrupted only by the second World War. By maintaining a reasonable profit margin, the cartel discouraged the birth or development of outside firms. In fact, the contrary result took place; as the

ALUMINUM PRODUCTION BY CARTEL MEMBERS AND
OTHERS, 1933-39
(1933 = 100)



graph above shows there was a decline in production of outside firms in relation to that of cartel members.

The second reason which influenced aluminum producers to pursue a policy of progressive lowering of prices is that the control of the cartels was inevitably in the hands of the low-cost producers and not of the high-

cost producers. This is easily explained. The lowering of costs in this industry is sometimes attained by technical discoveries, but is more often the result of large-scale mechanization and an increasing scale of production. The lowering of total costs involves as its counterpart an increase in investment or, more exactly, a relative increase in the sum of investment charges in relation to operating expenses. These great enterprises can obtain a substantial lowering of total costs only if their plants operate at full capacity. Consequently, their directors prefer to lower selling prices in order to increase production, and to raise their profits both by increasing the tonnage sold and through the lowering of unit costs.

On the other hand, high-cost producers tend to prefer a higher selling price on a smaller tonnage. But in this unequal struggle the low-cost producers necessarily have the last word, and we have seen from the figures given above that the preponderant role in the successive cartels has tended always to fall to low-cost producers. In the last cartel, Canada, which benefits from exceptionally favorable economic conditions, assured itself the first place.

Granted that the trend of aluminum prices compared favorably with that of prices in general, the question may still be raised whether price declines would not have been even more extensive under a competitive regime. Did not the restraints imposed upon production work against a maximum reduction of prices?

Since the aluminum industry was organized on the cartel basis at an early date, it is of course impossible to know what the long-term price trend might have been

had competition prevailed from the beginning. All that can be said *on the basis of the record*, is that, during the intervals when competition existed in the industry, the achievement was on the whole not as good as during the time when the cartels were in operation. However, because of variations in conditions, too much importance should not be attached to this fact. It is the author's judgment, however, that, except during the period of the first cartel, the policies pursued resulted in quite as favorable a long-term price trend as would have been possible under competition.

CHAPTER VIII

THE ALUMINUM CARTEL AND GERMAN WAR PREPARATIONS

Since the beginning of the second World War, the view has been strongly expressed that the international cartels were of great value to Hitler in his war preparedness program. This view has been expressed in numerous publications¹ and also most vigorously by the Kilgore Committee of the United States Senate in its report entitled *Cartels and National Security*.² It should be pointed out at this place that many of the criticisms made pertain to questions of patent legislation, prohibitive tariffs, and restrictive trade agreements, which have nothing to do with cartels as such.

The cartels which have been particularly subject to attack in this connection are those which operate in the chemical and metallurgical industries, among which is the aluminum cartel. Mr. Wendell Berge, Assistant Attorney General, expressed himself on the subject of aluminum as follows: "Through cartel manipulations, the Germans succeeded in . . . retarding the growth of

¹ See U. S. Library of Congress, Legislative Reference Service, *Cartels and International Patent Agreements* (mimeo.); Wendell Berge, *Cartels, Challenge to a Free World* (1944), p. 6; Wendell Berge, *The Sherman Act in the Post-War Period*, U. S. Department of Justice, Press Release, Dec. 14, 1943; H. C. Engelbrecht and F. C. Hanighen, *Merchants of Death* (1934); Ernest S. Hediger, "Cartel Agreements Hamper U. S. War Effort," *Foreign Policy Bulletin*, Apr. 3, 1942; and Joseph Borkin and Charles A. Welsh, *Germany's Master Plan* (1943).

² Report of the Subcommittee on War Mobilization to the Senate Committee on Military Affairs, 78 Cong., 2 sess.

French aluminum production to a rate which fell short of doubling the output in the period 1926-1938 while German production was increasing five-fold."

In view of the fact that the majority of the cartel members were living and working in countries which would be the object of German attack, it is strange that anyone could believe the cartels would deliberately follow a policy of helping the German militarists to gain the industrial superiority necessary for realizing their ambitions. But since this has been widely held it seems necessary to present the facts so *far* as the aluminum cartel is concerned.

I. THE RAPID EXPANSION OF GERMAN PRODUCTION

It is true that during the period from 1933 to 1939 aluminum production expanded much more rapidly in Germany than in other countries. As early as 1934 Germany requested the aluminum cartel to increase its production quota, contending that because of exchange difficulties it was necessary to substitute aluminum for imported copper. At the moment it was not clear to observers in other countries that Germany was launching a real rearmament program. In any case the cartel was not in a position to oppose the German request outright because, under the terms of the agreement, any country had a right to withdraw from the cartel by giving six months' notice. The cartel could only compromise. What was done was to permit the Germans to produce a portion of the additional amounts requested and to obtain the rest by means of imports.

The increase in German production was relatively

moderate in the years 1934 and 1935. At the end of 1935, it will be recalled, the modified agreement abandoned production quotas and left each member free to produce as much as he could find a market for. Thus, during the period 1936 to 1939 the cartel had no voice in controlling the volume of production in Germany. In fact, German production expanded during these years something like five-fold.

II. POLICIES PURSUED BY THE CARTEL

In due course cartel members in other countries naturally became concerned over the great expansion of German production. In 1934 and 1935 the president of the cartel kept his government (France) fully informed of the facts as to the abnormal increase in German demands for aluminum. Being struck by the rapid increase in German demands for aluminum, on June 20, 1934 I instructed my assistant, Mr. Dupin, manager of the French Aluminum Company, to write a letter to General Doumenc, Chief of the French Army General Staff, from which I quote the following passages:

In the course of a further meeting of the Board of the Alliance, which took place at the end of May, the Germans again put forward their request and in return for certain concessions, were finally authorized to manufacture 13,000 tons of aluminum in addition to their normal production quota, which had been fixed for this year at about 15,000 tons. Taking into account the reduction of stocks, German consumption in 1934 would thus be 36,000 tons, whilst consumption in 1932 and 1933 was less than half this figure and French consumption in 1933 was only 15,000 tons.

Mr. Schirner, representative of the Vereinigte Aluminium-Werke on the Board of the Alliance Aluminium Co., asserted that this increase was entirely justified by the increase of commercial outlets. . . .

The considerable increase in German consumption is attributed to two sets of causes:

1. The measures taken by the German government to stimulate industry, in particular, the automobile industry.

2. The severe restrictions on imports of copper by the recently established Raw Materials Office. Under this head alone it is estimated that aluminum consumption can be increased by 10,000 tons a year.

In the face of these facts, the Alliance could only authorize its German members to produce quantities corresponding to this increased consumption.

Nevertheless, and however plausible these statements may seem, *we cannot be absolutely certain that the increase in German requirements is justified solely on commercial grounds and that a part is not destined to meet military demands or to constitute a secret stock.* In any event, it seemed to us that these facts deserved to be brought to the attention of the War Department.

A few weeks later I went to Berlin and, in the absence of the French ambassador, I had an important interview with Mr. Wilhelm, the French commercial attaché, of which I have kept a memorandum reproduced below in its entirety:

Conversation with Mr. Wilhelm, French

Commercial Attaché in Berlin, August 25, 1934

I spoke at length with Mr. Wilhelm concerning the reactions of the French group to the enormous increase in German consumption. I reminded him that I had raised the question with the Commerce Ministry and the War Ministry and I asked him what he thought of it. He told me that the Quai

d'Orsay had raised the question with him, no doubt as a result of my letter to the Commerce Ministry, and he had just made a report on the subject.

The Germans are following the same policy for aluminum as for other articles. Mr. Wilhelm did not think that the development of new uses could by itself justify the doubling of German consumption and he supposed that the surplus must have been employed either to constitute secret stocks in arsenals or to manufacture large numbers of aircraft, thus using up great quantities of aluminum.

According to him, the two operations were perhaps going on at the same time. He indicated that the policy of the Germans was the same with regard to other products, particularly metallurgical products and raw materials for textiles, such as wool.

Mr. Wilhelm concluded by thanking me cordially for having kept the French government informed of these economic facts, which might be of interest even from the political point of view. He promised to speak about the matter to Mr. François Poncet, when the latter returned.

During the course of 1935, I began to have more and more serious doubts about the reality of the commercial motives presented by the Germans to justify their needs for additional production. I obtained from the Board of the Alliance a decision to send a commission representing all the producers for the purpose of examining the results obtained in Germany in the development of new commercial uses for aluminum and particularly in the replacement of copper in the manufacture of electrical material.

The Germans could not refuse. The inquiry commission went to Germany, received numerous invitations to very ample luncheons, but found no evidence of sensa-

tional progress in the use of aluminum to replace copper.

This visit strengthened my fears, which I communicated to the French government, writing to the Ministry of Foreign Affairs on April 1, 1935, as follows:

We have, up to the present, managed to prevent an excessive development of German aluminum manufacturing plants, which, in the state of over-all excess capacity in the aluminum industry, would be dangerous for the future from the commercial point of view and would *give Germany the advantage of an increased manufacturing potential in the case of an international conflict.*

Finally, in a letter of May 20, 1936, addressed to the Ministry of Foreign Affairs and the Commerce Ministry, I pointed out that, in spite of all the efforts made by the cartel, German consumption in 1936 would probably reach three times that of 1929.

Without the cartel, the Allied governments would not have been adequately informed as to the degree of expansion of the German aluminum industry or the nature of the use to which the products were being devoted. The ordinary espionage service could not readily obtain such information. Precise data on this subject could be obtained only through the personal contacts of technicians, capable of evaluating the information gathered from their German colleagues. The gathering of this information was, furthermore, greatly facilitated by the fact that under the rules of the cartel all members were obliged to have an annual detailed inspection of all their plants by a firm of consulting engineers of world-wide reputation. Price Waterhouse, and Company, after visiting the plants and examining all the accounts and technical and commercial documents,

drew up the exact figures of stocks, production, and sales.

We must next inquire whether the operations of the Aluminum Cartel resulted in restricting the increase of aluminum available *in France*. When, for the reasons indicated above, the cartel was obliged to authorize Germany to produce a rather modest supplementary quota in 1934 and 1935, the concession did not act in any way to the detriment of other producers, who remained free to manufacture all the aluminum they needed within the limits of their quotas. Since these two years were years of pronounced depression, the quantities manufactured by all producers naturally remained substantially below their productive capacity because *there were so few buyers*.

After December 31, 1935, producers everywhere were *free* to manufacture aluminum *without limit*. Hence the Aluminum Cartel cannot fairly be charged with having caused a scarcity of aluminum available to the Allied governments at a time when the need for a large program of aircraft construction became evident.

It is likewise impossible to reproach individual producers for not having developed their productive and finishing capacity more rapidly. Like all industrialists in every part of the world, the producers of aluminum developed their plants in line with the increase in demand.

As for the needs of the aircraft industry, they represented in normal times only a small part of consumption. In England the proportion reached a figure of 13 per cent in 1931. In France it reached 14 per cent in 1925

and 11 per cent in 1933. After Hitler came into power, it increased as follows:

1934	.....	18	per cent
1935	.....	28	" "
1936	.....	23	" "
1937	.....	32	" "
1938	.....	36	" "

It is difficult, however, to ask industrialists to make estimates based on the chances of a conflict or to foresee the extent of programs for the construction of military airplanes and the rapidity with which they are to be carried out. Such needs have nothing to do with peacetime requirements. The state alone is in a position to make such provision and to meet the capital costs, which are very heavy and only temporary in their usefulness.

Furthermore, right up to the time of the war, France was overproducing. In 1938, the last normal year from the economic point of view, exports of aluminum represented nearly 50 per cent of the quantity sold in France.

In case of a threat of war, the normal role of industrialists, whether associated in cartels or not, is to meet the demands of their governments by putting at the disposal of the latter their technical co-operation and the whole of their existing means of production.

The non-German aluminum manufacturers, owing to the fact that they were associated in a cartel and could thus foresee and understand the military preparations which were apparent in Germany, went substantially beyond this patriotic duty, taking the initiative in informing the Allied governments and asking them for instructions in view of the threatening situation.

III. REPRESENTATIONS TO THE FRENCH GOVERNMENT

I would again point out that as early as June 20, 1934, the attention of the French War Ministry was called to the sudden increase in the consumption of aluminum for military purposes in Germany.

In April 1935 the French Aluminium Company addressed to both the Army General Staff and the Director of Aircraft Construction a note concerning the possible increase in aluminum productive capacity in France. No reply was received to this note. On November 13 of the same year, a further note, setting out the steps which might be taken to increase production, was sent to the Director of Armament Manufacture. Again there was no reply. On November 23, 1936 a study was sent to the Director of Armament Manufacture, in order to let him know under what conditions the Alais, Froges et Camargue Company could bring its production up to 48,000 tons a year. There was no reply to this communication.

In 1937 direct contact was made with the Air Ministry, and the industrialists received a reply that the question would be studied. However, the exchange of views led to no concrete result.

On March 6, 1937 the Director of Armament Manufacture was informed by the French producers that, when their joint Beyrede plant began operations on April 1, 1937, production would be stepped up for the year to 37,000 tons. It was mentioned, moreover, that the same companies were taking the necessary steps so that in 1938 the productive capacity would reach a

figure of 50,000 tons. No comment on these communications was ever received from the department concerned.

On April 11, 1938 a further meeting was held at the War Ministry—at the instigation of the French Aluminium Company—to call the attention of the Army General Staff and the Secretary-General of the Ministry of War to the position of the aluminum industry at that time and the advantage there would be, from the point of view of national defense, in presenting the industry with a definite program.

In spite of this absence of guidance from the authorities, the producers decided, *on their own initiative and at their own expense*, to bring up their productive capacity by degrees to 55,000 tons (excluding the participation in the Norwegian industry, which represented an additional amount of about 5,000 tons). This figure was actually reached in October 1939.

It was only during the first months of 1939 that the producers were informed—and this only verbally—that it would be desirable if the figure of 55,000 tons were exceeded. Further discussions took place on this subject, but war had already broken out before a decision was reached.

It was not until November 1939 that two agreements were signed for the increase in capacity of the French plants. It was provided that there should be two stages: an increase of 15,000 tons (thus bringing production up to 70,000 tons), and a second increase of 20,000 tons (thus carrying capacity up to 90,000 tons).

In 1940 a third increase in capacity was decided upon which would have brought total production up to 96,000 tons, but this decision was afterwards reversed.

I have discussed more particularly the position of the French aluminum industry with respect to the impending war because I was directly involved in all the events just described. But I know that the attitude of the British vice-president of the aluminum cartel was substantially the same with respect to his government.

CHAPTER IX

CONCLUSIONS

In drawing together the threads of the foregoing analysis, it will be advisable, first to summarize the policies of the aluminum cartels in relation to certain major questions pertaining to the economic consequences of the cartel form of organization. In order to lend sharpness to the exposition, the following statement will run in terms of answers to certain specific questions.

1. *Was international trade impeded by artificial market restrictions?* The answer to this question may be stated categorically, as follows: In the early days of the aluminum cartel, with a view to preserving domestic markets for domestic producers, some restrictions were imposed upon exports, but since 1908 there has been no restriction on exports from any country to any other country.

In the author's judgment this is absolutely sound policy. Restriction of markets, if there is to be any, is a function of government through its commercial policies and not a proper function of business organization operating in the international field.

2. *Was expansion of the uses of aluminum restricted by the maintenance of artificially high prices?* Except during a two-year period 1906-07 the aluminum cartels have not followed a high-price policy. Owing to the lessons of experience, subsequent cartels followed persistently a policy of reducing prices as technological

progress made such reduction possible. After World War I, aluminum prices declined much more than did the prices of other important industrial products.

This long-term lowering of prices is fundamentally sound from the point of view of the cartel. There are two decisive considerations involved: the first relates to the minimizing of ordinary business risks, and the second to the long-term expansion of the market for aluminum products.

Under a system of free competition, commodity prices ordinarily rise rapidly during a period of prosperity. This advance of prices and of profits commonly induces existing producers to expand their productive capacity and also attracts new capital into the industry. The result is an expansion of productive capacity perhaps beyond what can be profitably used in the prosperity period and vastly in excess of the requirements of periods of depression. In consequence, periods of depression are accompanied by drastic reductions of prices. The aluminum cartel restrained the upward movement of prices during boom periods, thereby lessening competition during both the prosperity period and the years to follow and cushioning the shock of the depression itself. In short, the price policy pursued tended to remove the price peaks of the boom period and to prevent the extreme declines of depression years. By thus restricting profits during the boom period, the cartel escaped the catastrophic losses of depression periods.

Over a period of years this policy, which was articulated with cycle movements, resulted as we have seen in progressive reductions in price. As a result, the posi-

tion of the aluminum industry in competing against substitute products was steadily improved. The price policy pursued was at all times of benefit to the consuming industries. The long-term downward trend, coupled with the comparatively narrow short-term fluctuations, promoted the expansion of the market for aluminum products of every kind.

3. *Did the comparative stabilization of price in depression periods impede general business recovery?* The view is often advanced in economic circles that the primary requirement in time of depression is for prices to be rapidly reduced in order to increase demand. Experience has shown, however, that so long as prices are declining businessmen tend to postpone purchasing in the hope that prices will go still lower. Not until fear of further reductions disappears can orders be placed with confidence; and this fear usually does not disappear until prices have for a time been fairly stable. For this reason it has been the policy of the aluminum cartel to prevent prices in periods of depression from falling as low as they would have fallen under unrestricted competition. This is conceived as distinctly helpful in the situation rather than the reverse. The consuming industries for aluminum, as distinguished from traders or speculators, are interested in obtaining the quantities of the material they need at reasonably satisfactory prices. When they are convinced that prices of aluminum materials are not unreasonably high and will remain comparatively stable at existing levels, orders will be placed. This was the experience of the industry.

While the long-term demand for aluminum products

is expansive, no material expansion of demand can be secured in a period of depression by drastic but temporary cuts in prices. It should also be borne in mind that in many cases aluminum constitutes only a small part of the total cost of the finished product of which it forms a part. In such cases the ultimate price to the consumer would not be decreased in anything like the same proportion.

Accordingly, it is my belief that the stabilization policy in times of depression furthers, rather than impedes, business recovery.

4. *Did the aluminum cartel retard technological progress?* We have seen that one of the primary purposes of the aluminum cartel was to promote technical research and discover new uses for the metal. This was accomplished in part by co-operative action through the International Research and Development Office, and in part by the individual efforts of the different producers.

From the point of view of technical progress an industrial cartel is very different from other forms of business concentration such as trusts, monopolies, and integrated enterprises, which exercise direct financial control over a whole group of businesses or agreements between patent holders. The *industrial* cartel, as it was operated for 50 years in the aluminum industry, is based on an entirely different economic conception. It is an association of financially and industrially independent units which submit voluntarily, for a period of a few years, to a certain number of jointly accepted regulations, with a view to obtaining an improvement in their general situation. Such an association has neither the

power nor the wish to suppress competition but only to limit it for a fixed period of time. *Competition*, direct or indirect, survives.

I have noted at different places in this study that the spirit of competition between the different members of a cartel continues to exist, since the members, being bound by the cartel agreement for a short term only, have the natural ambition to obtain a better quota at the next renewal of the cartel. In order to reach this goal they have to improve their operations and to reduce their costs.

5. *Did the cartel encourage inefficiency through protection of high-cost producers?* It has often been contended that the cartel system, being obliged to reconcile the points of view of all the producers, is obliged to adopt a policy which does not hurt the high-cost producers. Consequently the expansion of low-cost, efficient producers would be restricted during the time the high-cost, less efficient producers were being protected. This did not occur in the aluminum industry. There is no doubt that in this industry, as in all industries, a divergence existed between the interests of the high-cost producers, who would have been satisfied with a policy of high prices and restricted market, and the interests of the low-cost producers, who were more attracted by a policy of low prices and great expansion of the market. But the low-cost producers were strong enough to impose their ideas on the others. This policy of lowering prices supported by the low-cost producers was not only a consequence of a general feeling that a reduction of prices creates new markets, but it was for them a real necessity.

Since the reduction of costs in this industry was generally the result of high mechanization and mass production, this reduction in operating costs was to a certain extent compensated by an increase in their investment charges. In order to obtain a low cost of production they had to operate their plants at the fullest possible capacity. On the other hand, in this internal fight between high-cost and low-cost producers the situation was unequal. The low-cost producers could continue to operate with profit without making any agreement with the high-cost producers; the contrary was not true. The low-cost producers were in fact in a position to impose their own views upon their colleagues.

The story of the aluminum cartels shows that the greatest need for an aluminum producer was to be well prepared to obtain better quotas in a new cartel or in the renewal of the existing one. The quotas were not based upon past ability or past sales records, but upon existing or potential development and better technical equipment. The result has been that the quotas were greatly modified during the period studied and that the leadership passed more and more into the hands of the lowest-cost producers.

On the other hand, it may with truth be said that the low-cost producer might well have reduced prices more quickly and somewhat more extensively had there been no necessity of working through the machinery provided by the cartel organization. In my judgment this is fully offset by the advantages resulting from the greater stability which followed from cartelization.

6. *Would government cartels bring price reductions?*
The view has often been expressed that the best solution

of the cartel problem is to replace *private* cartels by government cartel agreements similar to those now existing in agriculture and raw material products. Such a development would, I believe, serve to prevent progressive price reductions, because leadership would automatically be transferred to the high-cost producers.

In the private aluminum cartel, the low-cost producers dominated the discussions, because they were in a position to withdraw if prices were fixed too high. They were opposed to high prices because this meant a restriction of their production and in consequence higher unit production costs. But with government cartels, the high-cost producers cannot readily be outvoted.

In determining *quotas* for each country, not only economic but also political factors would have to be considered. A country might obtain a higher quota if it were friendly to the powerful countries. Moreover, to avoid disputes, it would usually be impossible to refuse a quota to a country having high-cost production, or to reduce the allotment to meager proportions.

In determining the cartel *price*, all member states must of course agree. But where political considerations are involved, it would be impossible to reach an agreement on a price which did not assure a sufficient profit to the highest-cost producing countries.

Moreover, the distribution of national quotas would inevitably be determined on other than strictly business principles. It would be difficult for a government to eliminate the high-cost producers. They would argue that refusal to grant them a part of the national quota would oblige them to close their mines or their plants,

with resulting unemployment in a certain state or section of the country. With the support of able political representatives, the high-cost producers might well seek subsidies to permit them to compete with the low-cost producers.

For a small number of agricultural commodities, however great the drawbacks may be, it may be necessary to have recourse to governmental cartels, since the enormous number of producers does not permit free agreements among them. But it would be a very great error to apply this imperfect solution, which frequently harms the interests of consumers, that is, the general interest, when it is unnecessary to do so.

The type of cartel organization here under consideration is an intermediary economic form between the monopoly of the trust and the unlimited competition of free enterprise. It has some disadvantages and some advantages.

A cartel cannot gain the maximum benefit that would be obtained by a trust or unified monopoly in the form of standardized plants, with production concentrated wholly in the most efficient units. Nor can the cartel, which deals with a standardized product, differentiate its prices to meet the requirements and paying capacity of the various consumers. On the other hand, members of a cartel have a very strong incentive to reduce costs and improve their position in the industry. In particular, the cartel is unlike the trust in that it is much more readily subject to dissolution or modification of the basic terms of the agreement. Competition manifests itself in

the conditions of each new agreement. On the other hand, it seeks to remove the excesses of competition.

SPECIAL FACTORS IN THE ALUMINUM CASE

The author does not wish to be understood as implying that the cartel system could operate in precisely the same way in all other industries or that the consequences would be equally satisfactory. While I believe that the principles and policies pursued in this industry are worthy of serious study alike by cartel managers and interested governments, I recognize that conditions in the aluminum industry are probably the optimum for making cartelization both *efficient* and *desirable*. These special conditions may here be recapitulated.

First, the irreducible overhead charges, including investment, research, and general operating expenses are unusually high—a fact which, in the absence of the cartel, would render this industry peculiarly vulnerable in time of depression. With unrestricted competition and drastic declines in prices, the losses would be unusually heavy. An incidental result of this would be that the high-cost producers, through failing to meet interest and other fixed obligations, are able to reduce prices further than the companies which elect to meet their obligations. Inasmuch as high-cost competition cannot be eliminated in the usual way, the low-cost producers commonly favor the cartel arrangement to safeguard against the risks involved in *abnormal* competition.

For the same reason, the production of aluminum cannot be quickly adjusted to changes in demand. With the copper industry, for example, an unexpected increase

in demand can quickly be met by the reopening of old high-cost producing mines or by the opening of new mines—with a delay of only two or three months. By contrast, the building of an aluminum plant in Europe requires at least two years, and a new electric power plant four or five years. As a result, the cartel arrangement which makes possible a better adjustment of supply and demand is especially advantageous in the aluminum industry.

Second, a cartel can be more effective in the aluminum industry than in many others. Aluminum is a highly standardized product and consequently various plants are engaged in the production of almost identical commodities, and the products offered to the consumer are of the same quality. Thus this industry does not present any difficulty for regulation of production.

Again, there are relatively few producers in the industry. Before the war there were not more than a dozen producers in the world, and roughly half of these were of small size. This situation made it much easier to form an association and to hold it together.

It should also be observed that in the aluminum industry all of the large aluminum companies are integrated, owning their own bauxite mines and producing both the virgin aluminum and the finished product. By contrast, the copper industry has a divergence of interests between producers, who are both copper miners and refiners and the custom smelterers, who limit their activities to refining ores which they purchase.

In the third place, the market situation is peculiarly favorable to the operation of a cartel system in the

aluminum industry. On the one hand, the small number of producers has made it possible to dispense with intermediary wholesale houses; the finished product is sold directly to the consuming industries. As a result, it is much easier to enforce the price schedules agreed upon. Moreover, because of this situation, speculation in stocks of aluminum is scarcely known. It can occur only in so far as a consumer might purchase in anticipation of price rises larger inventories than are currently required. But this possibility is safeguarded by the fact that there is no commodity market in which he can dispose of the excess or in which he can hedge operations. Again, aluminum is a product which once utilized cannot readily be reclaimed. Unlike copper, the great bulk of the metal is used in conjunction with other metals, and the separation would be difficult and expensive. In addition, much scrap is not usable after a few years because of oxidation. Because of this combination of factors, cartelization is easier to administer than is the case in most industries.

RECOMMENDATIONS

Cartels are of such divergent types that the principles of their operation cannot be reduced to a simple formula. I should, however, like to indicate here what seems to me the most valuable form of the cartel system and what its guiding philosophy should be.

First, I should emphasize that, if cartels are to yield maximum benefits both to producers and consumers, their administration should become less and less dictatorial. The various producers should be associated as members of a community; and there should be true co-

operation from all points of view—technical, commercial, and financial.

Second, cartel policy should not be crystallized in a single formula, but should be fluid, subject to change to meet the needs of varying conditions. During a period of crisis provoked by a sharp reduction in demand or an excessive increase in production, it seems clear that the only means of quickly re-establishing equilibrium between demand and supply is a temporary restriction of production. But it should be remembered that the production quota is not in itself the aim of cartels. The aim, it must be repeated, is *stabilization in time of crisis, long-term reduction of prices, and expansion of the market through technical progress.*

When the market situation is improving, restrictions on production should be largely, if not wholly, removed. This can be done without creating the danger of overproduction, by adopting a system of royalties to be paid to all the associates by the members whose markets develop more rapidly than the average. Finally, in periods of great activity, a primary task of the cartel is to restrain, and if possible completely check, the rise in prices which constitutes the industry's greatest menace.

Recognition of the importance of such policy may not, however, afford sufficient protection to consumers. Cartel managers are subject to pressures which it is not always possible to resist; moreover, they are human and as such are subject to errors, even though the errors may in the long run be detrimental to themselves. In any case, the economic power which they wield is such as to

require safeguards for the public interest. The author is in principle in favor of control, because he believes it would be beneficial to well-managed cartels and a protection to the consumers against badly managed ones. Because of the international character of these organizations, control should be international.

Of what nature can this international control be? I have indicated in the Introduction that the attitudes of America and Europe are, for valid reasons, essentially different with respect to cartels, and that there is little chance of changing these basic attitudes. Consequently, it would not be possible to suppress the international cartels by decree; some form of control system is the only practical alternative.

The solution is evidently to be found in the recognition of industrial cartels, coupled with regulatory measures designed to prevent abuses. This is, happily, the point of view which the American government has taken. I am in complete accord with this government's proposed solution, as set forth in the White Paper published in November 1945 by the Department of State under the title *Expansion of World Trade and Employment* and communicated to all governments invited to participate in the next International Conference on Trade and Employment. The American government proposes to create an international trade organization with the object of relaxing the barriers to international commerce.

The question of cartels is the subject of Chapter IV, paragraphs 1 and 2 (page 19) reproduced below:¹

¹ Italics added.

1. *Curbing of restrictive business practices.* There should be individual and concerted efforts by members of the [International Trade] Organization to *curb those restrictive business practices in international trade* (such as combinations or agreements to fix prices and terms of sale, divide markets or territories, limit production or exports, suppress technology or invention, exclude enterprises from particular fields, or boycott or discriminate against particular firms) *which have the effect of frustrating the objectives of the Organization to promote expansion of production and trade*, equal access to markets and raw materials, and the maintenance in all countries of high levels of employment and real income.

2. *Cooperation among members.* In order to achieve the purposes of paragraph 1, the Organization should be charged with the furtherance of this objective. The Organization *should receive complaints* from any member (or, with the permission of the member, from commercial enterprises within its jurisdiction who allege that their interests are affected), that the objectives of the Organization are being frustrated by a private international combination or agreement. The Organization should be empowered to call upon any member to provide information relevant to such a complaint; it should consider such data and, if warranted, *make recommendations to the appropriate members for action in accordance with their respective laws and procedures*; it should be empowered to request reports from members as to their actions in implementing such recommendations, and to report thereon. The Organization should also be authorized, within the scope of its subject matter, to conduct studies, to make recommendations concerning uniform national standards, and to call conferences of member states for purposes of general consultation.

In translating these proposals into formal language for a suggested charter for the international trade organization (which was submitted to the preparatory commission which met in London in October 1946) the

United States government would place a treaty obligation upon member governments "to take appropriate individual and collective measures" to prevent such practices. The language of the suggested charter also provides that the practices referred to above should be presumed to have the effect of restricting international trade "unless shown to the contrary in a specific case." This would place the burden of proof upon each individual government to convince the international organization that the stated practices of individual cartels conform to the general purposes of the organization.

In the fall of 1945 the Canadian government made an inquiry into the nature and effects of international cartels and other trade agreements. The report was signed by F. McGregor, commissioner, Combines Investigation Act. In the conclusion of this report, the commissioner gave full support to the general principles contained in the Proposals of the United States government.²

The British government declared itself to be in full agreement on all important points with the American government Proposals.³

The solution proposed seems to me in general both equitable and practicable. It does not condemn all private cartels without exception, but only those *which have the effect of frustrating the objectives of the organization to promote expansion of production and trade.*

² *Canada and International Cartels*, Report of Commissioner, Combines Investigation Act, Ottawa, Oct. 10, 1945, pp. 68-69.

³ Edward S. Mason, *Controlling World Trade* (1946), p. 62.

In my opinion, an important task of the organization will be to prepare a model set of rules capable of being adopted by all governments as the basis of their domestic legislation for cartels. I think that in this difficult task the organization should carefully avoid proposing government interference in the management and operation of cartels which, in order to be useful, must remain free, being responsible only in the courts for any abuses. The penalties in case of abuse might be the dissolution of the cartels or fines on its members.

Personally, I should be disposed to go a step further in regulating international cartels. One of the reasons for which cartels generally have a bad press is that they often seem to be secret organizations and thus antagonists can represent them as conspiracies against the public. This prejudice will disappear if cartels are registered with the international organization and with each government. I see no reason why an honest and reasonable agreement needs to be secret. When we created the fourth aluminum cartel, I submitted the text of the agreement to the French government. This very simple provision would, in my opinion, react to the advantage of the best types of cartels.

APPENDIX

OFFICIAL LONDON PRICE OF ALUMINUM INGOTS, 1919-38 (In pounds sterling per long ton)

Date	Official Price Per Long Ton
1919—January 1.....	200
January 17.....	150
1920—January 16.....	165
1921—February 10.....	150
August 10.....	120
November 30.....	95
1922—March 24.....	90
1923—January 29.....	92.10
March 5.....	100
March 16.....	110
March 31.....	115
1924—January 1.....	110
January 15.....	115
January 20.....	120
April 5.....	125
1925—January 1.....	118
1926—October 17.....	105
1928—May 18.....	95
1930—October 15.....	85
1931—September 24.....	95
1932—September 26.....	100*
1938—August 1.....	94

* Year of devaluation of pound sterling.

VARIATIONS IN THE OFFICIAL FRENCH PRICE OF ALUMINUM INGOTS, 1900-39^a
(Standard commercial prices)
I. IN PAPER FRANCS PER KILOGRAM

Date	Price	Date	Price	Date	Price
1918—January	7.50	1923—Oct. 5.....	7.70	1926—Nov. 10.....	16.50
1919—Jan. 8.....	4.87	Dec. 19.....	8.00	Dec. 3.....	15.30
Mar. 15.....	3.85	1924—Jan. 12.....	8.50	Dec. 31.....	14.60
Aug. 6.....	4.75	Mar. 12.....	9.50	1927—Feb. 19.....	13.30
Oct. 24.....	5.50	Aug. 19.....	10.15	1928—May 22.....	12.00
Dec. 2.....	6.25	1925—June 9.....	10.60	1930—Oct. 18.....	11.10
1920—Jan. 26.....	6.60	Aug. 24.....	11.05	1932—Jan. 6.....	10.50
Feb. 4.....	7.30	Oct. 29.....	12.00	1934—Oct. 4.....	9.50
Feb. 19.....	8.90	Nov. 29.....	13.00	1936—July 25.....	10.25
Apr. 20.....	10.00	1926—Jan. 1.....	13.00	Dec. 9.....	11.25
May 18.....	10.50	Jan. 18.....	14.00	1937—Feb. 1.....	11.02
Dec. 8.....	9.35	May 7.....	15.50	Nov. 2.....	12.00
1921—Jan. 7.....	8.50	June 12.....	16.25	1938—Mar. 14.....	12.24
Mar. 24.....	7.50	June 19.....	16.80	1939—Jan. 25.....	13.84
May 4.....	6.50	July 3.....	17.60		
1923—Feb. 2.....	7.10	July 12.....	18.35		
June 15.....	7.25	July 17.....	19.40		
July 21.....	7.45	Aug. 7.....	18.50		
Sept. 5.....	7.70	Sept. 18.....	17.80		

II. IN GOLD FRANCS PER KILOGRAM

Date	Price	Date	Price	Date	Price	Date	Price
1900.....	2.50	1918—January.....	7.35	1923—Dec. 19.....	2.16	1926—Dec. 3.....	3.06
1901.....	2.50	Dec. 23.....	4.60	1924—Jan. 12.....	2.04	Dec. 31.....	2.92
1902.....	2.50	1919—Mar. 10.....	3.50	Mar. 12.....	2.18	1927—Feb. 19.....	2.66
1903.....	3.10	Aug. 6.....	3.35	Aug. 19.....	2.84	1928—May 22.....	2.40
1904.....	3.15	Oct. 24.....	3.30	1925—June 9.....	2.54		
1905.....	3.00	Dec. 2.....	2.93	Aug. 24.....	3.19	1930—Oct. 18.....	2.22
1906.....	3.35	1920—Jan. 16.....	2.97	Oct. 29.....	2.64	1932—Jan. 6.....	2.10
1907.....	2.85	Feb. 4.....	2.62	Nov. 21.....	2.60		
1908.....	1.50	Feb. 19.....	3.20	1926—January.....	2.60	1934—Oct. 4.....	1.90
1909.....	1.60	Apr. 20.....	3.20	Jan. 18.....	2.80	1936—July 25.....	2.05
1910.....	1.65	May 18.....	3.67	May 7.....	2.48	Dec. 9.....	1.60
1911.....	1.90	Dec. 8.....	3.27	June 12.....	2.80	1937—February.....	1.57
1912.....	1.85	1921—Jan. 7.....	2.80	June 18.....	2.43	Nov. 12.....	1.23
1913.....	2.10	Mar. 24.....	2.70	July 3.....	2.52		
1914.....	2.10	May 4.....	2.79	July 12.....	2.11	1938—Mar. 14.....	1.15
1915—May.....	2.50	1923—Feb. 2.....	2.20	July 17.....	2.20	May 16.....	1.04
July.....	3.00	June 15.....	2.32	Aug. 7.....	2.60		
August.....	4.00	July 21.....	2.23	Sept. 18.....	2.49	1939—Jan. 25.....	1.12
1916.....	4.00	Sept. 5.....	2.21	Oct. 23.....	2.67		
1917—October.....	6.80	Oct. 5.....	2.21	Nov. 10.....	2.80		

* For the period 1900–11, prices indicated are not official prices, but estimates made by the French Aluminium Co.

VARIATIONS IN PRICES OF ZINC, LEAD, STANDARD COPPER, TIN, AND ALUMINUM ON THE LONDON MARKET
(Prices per long ton in pounds sterling)

Year	Zinc Cash, London			Lead Cash, London			Standard Copper Cash, London			Tin Cash, London			Aluminum London		
	Maxi- mum	Mini- mum	Per- centage Fluctu- ation ^a	Maxi- mum	Mini- mum	Per- centage Fluctu- ation ^a	Maxi- mum	Mini- mum	Per- centage Fluctu- ation ^a	Maxi- mum	Mini- mum	Per- centage Fluctu- ation ^a	Maxi- mum	Mini- mum	Per- centage Fluctu- ation ^a
1919....	59.5	34.75	71.2	46.25	22	110.2	117.5	73.5	59.9	342.25	204	67.8	200	150	33.3
1920....	62.5	22.5	177.8	53.375	21.5	148.3	122.25	70	74.6	419.5	195	115.1	165	165	—
1921....	28.25	23.5	20.2	26	16.5	57.6	75.25	65.25	15.3	210.10	148	42.0	165	95	73.7
1922....	39.25	23.875	64.4	27	19.5	38.5	66.125	57	16.0	187.875	139	35.2	95	90	5.6
1923....	38.125	27.75	37.4	31.75	23.75	33.7	76.625	59.125	29.6	240	176	36.4	115	90	27.8
1924....	39.25	29.75	31.9	44	27.75	58.6	68.75	60.375	13.9	298.25	200.75	48.6	125	110	13.6
1925....	40.625	33.5	21.3	43.75	30.75	42.3	67.937	59.062	15.0	290	229	26.6	118	118	—
1926....	39.25	31.75	23.6	35.15	27.312	28.7	60.562	56.187	7.8	321.125	261.375	22.9	118	105	12.4
1927....	32.75	25.625	27.8	28.875	20.062	43.9	60.91	52.937	15.1	319.625	257.312	24.2	105	105	—
1928....	26.937	23.75	13.4	22.812	19.187	18.9	74.75	60.062	24.5	266	205.75	29.3	105	95	10.5
1929....	29	19.625	47.8	29.75	20.875	42.5	97.563	66.25	47.3	229.75	174.062	32.0	95	95	—
1930....	20.062	13.25	51.4	21.75	14.625	48.7	74.875	41.375	81.0	180.562	104.562	72.7	95	85	11.8
1931....	14.75	9.687	52.3	15.625	10.437	49.7	47.437	27.717	71.1	141.937	100.312	41.5	87.96	85	3.5
1932....	11.30	8.60	31.4	10.25	7.70	33.1	28	19.35	44.7	109.5	84	30.4	72.46	68.84	5.3
1933....	12.35	9.80	26.0	9.5	7.45	27.5	26.10	19.80	31.8	153.75	100.90	52.4	68.49	68.49	—
1934....	10.35	7.25	42.8	7.3	6.25	16.8	21.55	16.5	30.6	137.25	137.25	12.1	61.72	61.72	—
1935....	9.80	7	40.0	11	6.25	76.0	21.75	16.80	29.5	140	125.60	11.5	59.87	59.87	—
1936....	10.80	8.25	30.9	15.30	9.20	66.3	28	21	33.3	139.90	112	24.9	60.60	60.60	—
1937....	19.35	9.35	107.0	19.45	9.50	104.7	43.85	23.75	84.6	169	114.35	47.8	60.60	60.60	—
1938....	9	7.25	24.1	9.92	7	41.7	27.10	21.50	26.0	123	98	25.5	60.60	56.28	7.7

^a These percentage fluctuations for each year have been calculated by comparing the difference between the maximum price and the minimum price with the minimum price.

COMPARISON OF WORLD CONSUMPTION OF THE PRINCIPAL NONFERROUS METALS, 1921-38

Year	Aluminum		Copper		Zinc		Lead		Tin	
	Metric Tons	Index Number	Short Tons	Index Number	Metric Tons	Index Number	Metric Tons	Index Number	Long Tons	Index Number
1921.....	71,200	100	621,900	100	478,000	100	840,600	100	81,700	100
1922.....	97,900	140	891,000	142	794,700	166	1,044,300	123	131,800	151
1923.....	138,200	195	1,178,800	190	950,300	200	1,152,400	137	137,000	168
1924.....	169,500	240	1,322,800	210	1,031,500	215	1,304,400	156	136,200	166
1925.....	183,100	256	1,447,300	230	1,176,600	246	1,496,900	177	154,600	189
1926.....	190,400	275	1,480,000	238	1,228,500	257	1,561,200	186	151,400	185
1927.....	180,900	265	1,525,200	244	1,308,200	275	1,604,300	191	156,900	192
1928.....	236,300	330	1,725,000	277	1,416,700	295	1,654,600	196	175,300	214
1929.....	268,800	380	1,984,800	320	1,442,500	300	1,708,100	202	184,300	226
1930.....	209,400	294	1,639,400	262	1,232,600	260	1,524,900	181	161,100	197
1931.....	175,000	245	1,372,700	220	1,027,100	215	1,300,500	154	134,300	161
1932.....	150,000	210	1,074,200	172	842,000	177	1,117,300	133	116,800	143
1933.....	155,000	219	1,271,500	205	1,008,700	210	1,198,100	142	144,600	177
1934.....	210,000	295	1,515,200	240	1,158,800	241	1,369,200	163	139,900	171
1935.....	307,000	430	1,805,700	290	1,371,600	287	1,458,400	174	162,400	198
1936.....	407,400	575	2,000,200	338	1,514,900	315	1,586,700	188	174,600	214
1937.....	501,700	705	2,378,600	380	1,605,600	337	1,732,400	206	192,500	235
1938.....	515,000	725	2,143,800	342	1,426,700	300	1,607,300	192	164,600	215

**GOLD FRANC PRICES OF ALUMINUM AND WHOLESALE
COMMODITIES, 1922-38**
(Indexes, 1922-25 = 100)

Year	Aluminum	Wholesale Commodities
1922.....	109	97
1923.....	88	99
1924.....	93	99
1925.....	109	104
1926.....	104	88
1927.....	105	99
1928.....	98	100
1929.....	94	99
1930.....	92	86
1931.....	87	73
1932.....	82	64
1933.....	82	61
1934.....	80	58
1935.....	74	55
1936.....	75	54
1937.....	59	55
1938.....	42	46

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